

C. A. Chant — Autobiography  
Carbon Copy, in 3 vols.

Vol. I, Chaps. 1 to 19  
Typed pages, 1 to 456

# AUTOBIOGRAPHY : C. A. CHANT

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I. SEVENTY YEARS AGO -- THE QUIET LIFE

C. A. CHANT

The Day that I was Born

It was on Wednesday the 31st day of May 1865 that I was ushered into this world, and I have never heard that any shimmering auroral display or other celestial portent gave significance to the event. In later years I asked my mother the hour of my birth. She said 6.30 in the morning. I had in mind to try at some later time to work out my own horoscope. But continued attempts to understand the methods followed by the astrolôgers in making their predictions led me to believe that they were purposely vague and indefinite in their definitions and explanations, and that their forecasts were entirely devoid of scientific foundation.

At a much later date I had the opportunity of examining the original record made at the Meteorological Observatory in Toronto for the above date. It runs somewhat as follows:

(Temperature at 2 p.m.,  $76^{\circ}$ ; mean for the day  $68^{\circ}.4$ .  
Fair day. Hazy round the horizon. Frogs noisy at night).

Nothing remarkable there! Probably the frogs were in the classic Taddle which ran through the University grounds, but which is now covered up and its existence is unsuspected. The site where these observations were made is now some miles from any frog pond.

My Birth-place

The place of birth was Hagerman's Corners, a hamlet in Markham Township about fifteen miles north-east of the City Hall in Toronto. My father, Christopher Hull Chant, was born in Stoke-



under-Ham, Somerset, England, in 1835 and came by sailing ship to Canada in 1841. He learned the trade of cabinet maker in St. Catharines. In a book entitled "History of the Indians of North and South America", by S.G. Goodrich (Peter Parley) I find the following inscription:

Christopher H. Chant  
Presented by his Friend, Martin Snively  
St. Catharines 1st March 1856

It was Snively who taught my father his trade and no doubt this gift was made on completion of his apprenticeship. I believe he went to Hagerman in the autumn of that year or early in the next. My mother, Elizabeth Croft, was born in Markham Township in 1840, February 20. Her parents came from Binbrook in Lincoln County, England. My father and mother were married June 15, 1858. I was the fourth in the family, there being two brothers and one sister before me. I was the youngest for twelve years when another sister was added to the list.

My earliest recollection is that, when I was perhaps four, on a winter day I begged to be allowed to walk to my Aunt Amelia Hagerman's house about a quarter-mile away. The road was snowy and slippery and I almost froze my hands, which my Aunt restored by putting in cold water.

A year or more after this the narrow-gauge Toronto and Nipissing Railway was being built across Markham Township, and at the time to which I refer the iron rails were being laid on the grade down Hagerman's Hill, a mile or so away to the north-west from our house. I could hear the noise when the rails rolled off the flat-cars of the construction train onto the ground. My brother



Havelock, two years older, stood me up on a lumber pile to watch the operation. Some months later I went with my mother to the house of John Hagerman, who lived next the railroad, to see the little engine as it puffed hard to pull its short train up the steep hill.

### School Section 8

On May 1, 1871, when I was one month short of six years old, I started school in Section 8 of Markham Township. The school house was west of the railway and about three-quarters of a mile from my home. I remember the 'bush' - largely the original x beech, maple and pine - came right up to the school yard. I recall that one day two of the older boys (John Young and William Carter) were sent into the bush to cut a couple of rods to punish any offending scholar. One of the rods was so long and straight that it was used as a vaulting-pole. The bark had been peeled from the shorter one and it soon dried out and became brittle. The lad 'Billy' Carter who brought it from the bush was the first to be punished with it. As the master brought it down on his outstretched hand the end of the rod snapped off into several pieces. The other children looked on with amusement, and Carter simply grinned. Not very effective punishment! This teacher, however, was not a harsh disciplinarian.

Near the end of the fall term, a few days before Christmas, the teacher, upon his return from lunch, found the school door locked against him, and he was not admitted until he went to the store and bought some candy to treat the boys and girls.



The railway track, about forty rods from the school, was at the bottom of a deep cut, made to reduce the steepness of the grade, and with the winter storms much snow fell and drifted into the cut. The larger boys used to stand on top of the bank and jump into the deep snow in the ditch and then try to wriggle out of it. The fashion in boys' boots then was long ones up to the knees, pulled on by means of leather lugs and pulled off with the help of a boot-jack. Well, in trying to extricate one's self from the deep snow the boot would often come off and there was difficulty in recovering it. Sometimes when the snow was wet and soft it would be rolled into a big ball and onto the track. This would usually be done at noon. It was interesting to see the engine quickly break the snow-ball into pieces and throw the fragments out of the way.

#### The Toronto and Nipissing Railway

The Toronto and Nipissing Railway was built under a provincial charter passed in the 1867-68 session of the Ontario Legislature. Its gauge was 3 feet, 6 inches; and, as it ran from its terminal at the foot of Berkeley Street to Scarboro' Junction over the same right of way as the Grand Trunk Railway, which was of standard gauge, a third rail was laid  $14\frac{1}{2}$  inches within one of the Grand Trunk rails. From Scarboro' Junction the road ran northward touching the villages Agincourt, Unionville, Markham, Stouffville, Goodwood to the town of Uxbridge, and then on to Cobocok, a distance of 78 miles. It was never continued to Lake Nipissing.

According to Mr. John Duncan, who was appointed traffic superintendent of the T. and N.R. on Christmas Day, 1873 and held



that position for about eight years, the railway was "operated to Uxbridge on October 7, 1871, and completed to Coboconk spring of 1873." The YORK ATLAS, published in Toronto, in 1878, says: "The road is a three foot, six inch gauge and was the first narrow gauge opened for traffic in America".

I remember going with my mother on an excursion to Coboconk (68 miles from Unionville), the return fares being 50 and 25 cents. The accommodation was hardly first class as we travelled in box-cars with seats around the ends and sides. However, there was a big crowd and a hilarious time.

There were about a dozen engines on the line, each bearing a number and a name. Number 1 had a high pitched whistle and bell. Number 9 was a "double-header" and its name was "Shedden", after a high-up officer of the company. The two ends of this powerful engine were identical with the "cab" midway between the smokestacks. It was continually getting in trouble. It ran off the track and plunged into the creek near Uxbridge, from which it was pulled by a similar engine from the Toronto, Grey and Bruce Railway. Finally at Stouffville its boiler exploded and caused several deaths and great destruction. These engines burned wood, which was cut to proper lengths and piled on half-cord or cord racks convenient to the rails from which it was loaded on the engines. There was a large wood-yard just east of Unionville.

This line brought down much lumber and farm products. In 1882 it was acquired by the Midland Railway, which crossed it at Lorneville Junction, and it was widened to standard gauge. At first a third rail was added and freight trains running between Lorneville



Junction and Scarboro' Junction were frequently made up of broad and narrow gauge cars, coupled with what were known as "goose-neck couplings". Then the narrow gauge was entirely discarded. In 1884 the Midland Railway was merged into the Grand Trunk System.

I attended Section 8 school for almost two years. It was usual for a prize to be presented at Christmas to each scholar. My first one was a paper-covered picture book entitled "The Sleeping Beauty in the Wood"; but I did not receive the second until after I had left. It was a little 98-page book entitled "A Light for the Line", an English story of a railway worker who lived about 1830, reprinted in the United States. The inscription in it was:

S.S. No. 8, Markham. 3rd Prize Awarded to Gus. C.  
Chant for General diligence in School. March 1873,  
John C. Bain, Teacher.

The book was rather 'old' for me to read but I did pore over it, and discovered a very long word, with nineteen letters in it, the word straightforwardness on page 13. I have the book still.

Seventy-three years later, with my sister, I drove past the school grounds, now much enlarged and improved. A new schoolhouse was erected in 1888 and fifty years afterwards, on June 25, 1938, some of the old boys and girls celebrated the occasion by a picnic, which, on account of rain, was held in the schoolhouse. The brush then was some distance back from the school property but there were still some of the original forest trees in it, although it is mostly second growth.

We halted the car a short distance west of the school, in



order to view the country about. A mid-aged man who was ploughing some straight furrows with a tractor stopped and came over to speak to us. He was Clarke Young, a son of John Young, a big pupil when I was a small one, who lived on the old homestead, while his younger brother William lived across the side-road on the property occupied by Sinclair Hagerman in the early days. This was the only case in the neighborhood where the original name still persisted.

At the time that I left the Hagerman school in 1873 my deskmate was Thomas Alexander Gibson. He was a born artist, and although only seven years old he drew on my slate a living picture of a horse, which I proudly carried away with me. We were deskmates also at Markham High School and read Virgil and Horace together. In September 1882 he went to Toronto Collegiate Institute (Jarvis Street), where he captured the prizes in art and did equally well in the more academic subjects. He graduated B.A. with first class honours in Classics in the University of Toronto in 1888. Then he studied law and has practised in Toronto ever since. He is a K.C., or, under Elizabeth II, Q.C. His brother John graduated B.A. in 1879 and went to British Guiana as a missionary, where he died in 1888.

#### Village of Unionville

In the early summer of 1873 my family moved northward a mile and a half, from the top of Hagerman's Hill to the village of Unionville in the valley of the Rouge River - or 'crick' as we called it. The influence of the railway was already becoming evident. Before it was built the greater part of the population of the village was north of the bridge over the river, but now the new



stores and houses were nearly all being erected south of the river, convenient to the railway, and this growth to the south has continued ever since. One of the new stores was called the "Toronto and Nipissing House". The village used to be a stopping-place over night for wagon loads of grain, hay and other produce on the way to the Toronto market. But this was now all changed. The hotels north of the bridge - in "New York" we dubbed it - were closed and a new one, called the Queen's Hotel, "one of the most commodious and attractive hotels north of Toronto" \* had just been completed in the south part.

In every town and village of importance in the country there was a carriage factory, some of them with a wide reputation, - as in Markham and Richmond Hill. There were also usually one or more blacksmith shops in every place.

In Unionville, William Eakin had just built a wood-working factory on land adjoining the railway and was giving up his carriage-making business near by. His shop was purchased by my father and adapted for the cabinet-making business.

It is remarkable how prominent names disappear from a settlement in a few years. At this time there lived in the community Mr. Eakin's father and also four of his brothers, but in forty years the name had disappeared from the neighbourhood. It was the same at Hagerman's Corners. Six or more families of that name were the leading residents in 1860; now, not one of that name!

Even more notable is the name Eckardt. When we moved to Unionville there were in that part of Markham Township at least ten families

\* History of York County (Toronto, 1885). Vol. 2, p. 291



bearing that name. In seventy years not one was left.

William Eakin with his family migrated to the 'North West' about 1885. While living in Unionville he had taken much interest in municipal politics. He was elected Reeve of Markham Township in 1873 and Warden of York County in 1881. In the West he rose to be Speaker of the Legislative Assembly which met in Regina. The organization of Saskatchewan and Alberta into separate autonomous provinces took place in 1905.

The chief industry of the village was the Flour Mill of Hugh Powell Crosby. Mr. Crosby had married Harriet White, daughter of Ira White who had established the business some considerable time before this. Indeed the first mill had been burned about 1863 when my eldest brother was four years old. He was stood on a window sill to look at the fire and was left there while his father and others went down to Unionville to help subdue the flames. Mr. White had also operated a saw mill, but it was not in use when we moved to Unionville.

In the earlier days there was a mill driven by water-power at about every mile of the Don and Rouge rivers. I find that in 1850 there were thirteen grist mills and twenty-seven saw mills in Markham Township, which then had a population of 6868<sup>\*</sup>. The Unionville mill property was quite imposing. It included a fully-equipped cooper-shop, houses for the workmen, a general store, wagons for bringing in supplies and shipping out the products of the mill. The water power to drive it came from a large pond covering about 75 acres. I was much interested in the way the miller would receive the grain from the farmer's wagon, dump it

\* History of the County of York, Vol.I, part II, page 120 (Toronto 1885)



into a hopper and weigh it, and then allow it to drop down to the basement, where it was picked up by the ever-moving elevators and carried to the proper bin on one of the upper floors. I used to also watch the miller with his crane lift the heavy mill-stone, swing it out of the way, reverse it top for bottom, lower it to the floor, and then skilfully sharpen it with his steel hand-pick. \* In the Crosby family there were four boys and three girls, every one clever and distinguished. Mr. Crosby himself was a member of the first Legislature of Ontario after Confederation. Perhaps the one of the family who achieved the greatest success was William Hugh, who was born August 3, 1862, and died June 26, 1944. He migrated to the United States, and in Buffalo built up a big business in the manufacture of iron and steel products. He made princely donations to the University of Buffalo; he also provided a splendid arena and rose garden on the old homestead in Unionville for the use of the community; and indeed he made many other handsome gifts to worthy causes. 'Will' Crosby was about three years older than I. He had gone to high school and had become a teacher in the east part of the township at the time when I was in my last year at public school. He visited our school one day and listened while we 'recited' a lesson in Euclid. Then he spoke to us and asked us about the questions at the bottom of the page, and thus introduced us to the solution of deductions. This we had never thought of before; we simply prepared the proposition which was assigned as our lesson. We followed the reasoning

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\* Illustrated in Jeffery's Picture Gallery of Canadian History, Vol. II, p. 85 (Toronto, 1945)



easily enough but never considered the meaning of it all. In later years I often recalled this experience; it opened my mind to the meaning of Euclid's Elements of Geometry. If a person fully appreciated the demonstration of Euclid's propositions he would be able to solve the exercises. This was a distinct step in my education.

I learned to swim in the 'crick' and sometimes we swam in the big pond. Some of the bigger boys and better swimmers would swim out to the stumps, one after the other, which rose perhaps a foot above the water. They were the stumps of original forest trees. Occasionally we bathed in the limited space beside the big overshot water wheel and were thrilled when the water splashed over us and rushed onwards into the tail-race. Some years later this old - type wheel was replaced by a small turbine, and I wondered how such a little machine could have so much power. Then in more recent times a Diesel engine was installed; but long before this the great milling companies had taken away all the business of making flour from the small country mills, which were reduced largely to "chopping" for the farmers of the neighborhood. Finally in the summer of 1934, the big red mill was burned to the ground! Sic transit gloria rustica!

In the winter time the older boys would clear the snow off a portion of the pond for skating. My first pair of skates had wooden stocks or bodies. A screw at the rear end was screwed into the heel of the boot, and a long strap passing through slots in the wood and around the boot held the skate securely to the foot. Next in order was a pair made from steel. A short post with



a head on it like a "cut" nail went through an oblong hole in a plate let into the heel of the boot and was held tight there, while clamps were screwed up securely with a key (I have it still) against the edge of the sole of the boot. Then the spring skates came in; these we thought just perfect. We never dreamed of the extravagance of skates screwed to the soles of boots used for nothing else but skating.

In the matter of summer sports, the favourite game played by the boys, old and young, was cricket. A local 'eleven' representing the village could put up a creditable opposition to those from the neighboring towns - and sometimes from the big Toronto. Later, baseball became the favourite. It was much simpler to organize, and the <sup>e</sup>quipment was less expensive. That was the time when the pitcher had to put the ball high, low or medium as requested by the batter, but he could deliver nine 'balls' before the striker was allowed to take a base.

Then there were croquet matches on the level lawns, and some of the players were extremely expert. They seldom failed to knock an opponent out of position, were he five or fifty feet away.

In winter the chief game was shinny - the original of the modern hockey. Usually we would go to the 'bush' and cut our own shinny stick, or simply shinny, selecting small straight young trees with suitably curved roots. Sometimes the shinny was of hardwood, at other times of cedar, which was light and good for quick action. I was always on the lookout for a tree which would make a good shinny. Simply moving the stem of the tree back and



forth would show the general shape of the root. The game was played on the ground - the school-yard, for instance - or on the ice, and not infrequently it gave rise to a lively row.

### The Big Flood of 1878

As we walked along the shore of the pond, perhaps to see if there were any hazel nuts up at the head (the only place to find them that I knew of), or to fish in the deeper spots for chubs and sunfish and mud-cats, we used to wonder what the pond would look like if the water were drained off. At last we found out. In 1878 in September, from the 10th to the the 13th, there was a continuous heavy rain. According to the records of the Meteorological Office in Toronto the rainfall during this period was

|                    |    |     |             |        |
|--------------------|----|-----|-------------|--------|
| Tuesday, September | 10 | ... | 0.21        | inches |
| Wednesday, "       | 11 | ... | 0.76        | "      |
| Thursday, "        | 12 | ... | 0.96        | "      |
| Friday, "          | 13 | ... | <u>3.08</u> | "      |
| TOTAL              |    | ... | 5.01        | "      |

The average rainfall for the month of September, based on records for the past sixty years, is 3.18 inches, so that on September 13, 1878, almost as much rain fell as usually occurs during the whole month. The water overflowed the banks of the river until in the lower flats it was above the fence posts. The pond was brimming over. The water rushed in a mighty torrent over the heavy timbers of the dam, and in places was running over the great mud embankment, slowly wearing it away. This embankment had been made strong by the roots of large willow trees planted there a generation earlier.



At last, on the morning of Saturday, September 14, as we stood on the hill beside the cooper-shop, in the drizzling rain, and watched the swirling water, the east end of the dam, next the embankment, gave way and the water rushed out in still greater quantity into the level below. A little while later the willow tree nearest the tumbling dam was undermined and rolled over and over into the waters below - in gurgite vasto. About a quarter-mile away on the highway was a wooden bridge spanning the river. It was slowly lifted from its foundations and carried some four hundred yards into a field where it came to rest against a big elm tree - still standing there.

Many dams and bridges were washed away in that great flood. Three days later, on September 17, there was a Dominion General Election, and many voters had difficulty in reaching the polling boots. At that time Canada was passing through a serious financial depression, The government of Alexander Mackenzie was defeated, and John A. Macdonald came into power and introduced the high-tariff "National Policy".

When the pond was empty we saw clearly how two branches of the Rouge came together at its head and then flowed onward in a crooked channel. In a few weeks weeds and shrubs began to grow along its banks and in the bed of the pond. At some times of the year the current was small, but a heavy rain on the clayey soil caused a rapid rise in the water and could do considerable damage. Much labour, with the accompanying great expense, has been devoted to rebuilding the dam, but it was never made strong enough to withstand an extra heavy flood, as it did in its early days,



and it continually broke away. Now it has no commercial value.

### Unionville Public School

When we moved to Unionville my eldest brother, aged 14, went into the shop as an apprentice to his father, and the other three of us children attended the village school. At the Christmas examination of that year (1873) every pupil in the school as usual was given a prize. Mine was number thirty. It was entitled "The Magnet Stories, for summer days and winter nights." There were seven excellent tales, all by reputable authors, among them being W.H.G. Kingston, G.E. Sargent and Thomas Hood. I can read them with pleasure to-day. At my last Christmas examination at that school (1878) I was number two and my prize was "Hebrew Heroes" by A.L.O.E., whose real name I did not learn until some years later.

Even at that early time there was talk of young men and women using the teaching profession as a stepping stone to some more desirable position; but such mild criticism could not be made of our teacher. His name was William Braithwaite, the eldest son of a village merchant, and I received instruction from him for six years. He was in charge of the school some years before our advent and continued a considerable time after I left. He was not a broad scholar and as I look back I should say that the chief fault of his teaching was his failure to give the older boys and girls any notion of the significance of some of the subjects they were studying. He would assign a definite portion of the text-book as the next lesson, and when the proper time



came the class would stand up on the floor and recite it. A little study and thought on his part might have led him to make some remarks on our reading of history or of other lessons which would have opened up new views to our young minds. Would it not have been possible for him to lift slightly the veil about the Goddess of Learning and allow a glimpse of her dazzling beauty? Were we too young? I do not think so. I have long thought the teacher needs wider scholarship rather than extended professional training.

However, our teacher kept excellent order, and he certainly did not aim exclusively at the entrance examination into the high school. Indeed he paid little attention to it. I had taken up only fifty or sixty pages in the Fourth Reader when I was promoted to the Fifth Reader. Now, for the Entrance Examination there were prescribed certain lessons in the Fourth Reader on which questions of a literary nature would be asked. Some of these I had not read over when I wrote on the examination. Further, there was a paper on English History to which subject we had devoted very little time. I had read a few pages of Edith Thompson's History and also of E.A. Freeman's General Sketch of European History. But very few candidates from our school ever failed to pass. Our teacher certainly laid stress on the three R's. Perhaps "cramming" for examinations became the fashion after I left! Albert Crosby, the oldest of the family I have mentioned, and perhaps ten years my senior, told me that when he applied to enter the High School, all he was asked to do was to analyse and



parse the sentence, "A dog follows his master." The examination was much more elaborate when I wrote on it in July, 1879.

When I started at the Unionville Public School, as a matter of course I went regularly, and I attended every day in the year for several years. Naturally I went to our Methodist Sunday School, and as the Congregational Church was next my father's shop, I went to Sunday School there also. On one of my bookshelves I still have some twenty-five prizes given me at the day and Sunday Schools.

### Spelling Match

During my last year in the public school I studied Euclid to the end of his First Book, and Algebra to the end of simple equations; and before I say good-bye to the village school I must refer to my experience in spelling matches. They provided a common amusement on Friday afternoons. About February in 1879 the teacher at Buttonville, on the fourth concession of Markham, challenged all the public schools west of the sixth concession, on which Unionville is located, to a spelling match. With two or three others I walked over to it. The words were to be chosen from the school Readers, the old red-covered series issued by Egerton Ryerson, copyrighted in 1867. After the contest had proceeded for some time four others and myself were left on the platform. A word was announced. The person ahead of me spelled it v-e-r-m-a-l, which was declared wrong. I thought of vermilion and ventured v-e-r-m-i-l,.Wrong! The person next me (a girl name Barnes) said v-e-r-m-e-i-l. Right! and I went down. She then spelled the other two down and was declared the winner. On reporting my luck to our own teacher at home he found that vermeil, the word in the Reader,



was a French word, of which vermil was the English equivalent, and that my spelling was really not wrong. As I have remarked, I had not spent much time in the Fourth Reader and this word had been taken from a poem near the back of that book. The poem is entitled "All Creatures Called upon to Praise God." It is a paraphrase of the 148th Psalm. The first line is --

Begin, my soul, th' exalted lay!

The fifth stanza runs -

Ye Flocks, that haunt the humble vale,  
Ye insects, fluttering on the gale,  
    In mutual concourse rise;  
Crop the gay rose's vermeil bloom,  
And waft its spoils, a sweet perfume,  
    In incense to the skies.

The appended name of the author is Ogilvie. I have since learned that John Ogilvie, D.D., was born in 1733, was minister of Midmar, Aberdeenshire, from 1759 until his death in 1814. In 1769 he published "Poems on Several Subjects", in 2 vols. From Vol. I the poem is taken.

So our teacher issued a challenge to all the schools in the township. I may say he was an able chess-player and often during recess he would ponder over his pocket chess-board by means of which he carried on matches with players in Canada and the United States. He would enter his "moves" in the games on post cards (which cost only one cent then) and would often have a number to post on his way home after school. In the present case he sent a post card, in his fine handwriting, to the principal of every school, inviting him to send pupils to the proposed spelling match. On the specified date a large number of contestants



appeared, and they were arranged in a long snake-like row on the platform of Crosby's Hall, which was crowded with grown-ups from near and far, although the muddy roads were almost impassable. The spelling began and soon the line became shorter. At last all were spelled down except the Buttonville winner and myself. A word was given out. She spelled, s-c-u-r-r-a-l-o-u-s. I did not wait a second but called out, s-c-n-r-r-i-l-o-u-s, and was awarded first prize. This consisted of five volumes: Shakespeare, Tennyson, Campbell, Coleridge, Bunyan, - all of which I still have in good condition.

This prize was of real value to me in obtaining an education. If any book came into my possession I always tried to find out the nature of its contents. In this case, Shakespeare and Tennyson were rather difficult. Some years passed before I began to appreciate them. The volumes relating to those two authors now on my shelves have multiplied more than fifty-fold; and in any second hand catalogue coming to me I never fail to see what items there are under Shakespeare and Tennyson. I am sorry that Tennyson has fallen on evil days and is so neglected at the present time. Indeed some of our modern poets have ventured to 'revalue' him - scaling him downwards, of course, - and in some instances have stooped to make unkind remarks about his personal appearance. Such individuals seem not to realize the greatness of the achievements, in every department of life, made by the English people during the long Victorian period; and that Tennyson was regarded as the mighty voice of England. He contributed much to the literary and artistic wealth of the nation. Fashions may change, but there has been no successor comparable to him.



Campbell and Coleridge were easier and I read them completely through, not omitting the scholarly introductions. The PILGRIM'S PROGRESS of course appealed to me and I have read it several times in that same volume; also in a volume printed in shorthand.

### An Interesting Library

My father's library was not large but it was creditable. Perhaps I should mention first John Frost's Animated Nature, a quarto volume about three inches thick, with several wood-cuts on each page and brief descriptions between. We all pored over this book and before we finished with it the covers were off. I think my brother, two years older than I, got the remains of it. Then there was J.T. Headley's Life of Washington, published in 1861. Along with it as a supplement there had come a separate coloured plate bearing the title, "Bird's-eye View of Mount Vernon, the Home of Washington". This my father had mounted in a frame composed of eight or more strips of different kinds of wood skilfully glued together, to form a moulding. This picture in its frame was one of my earliest recollections in our home and now it hangs in a prominent place in the hall of my house at the Observatory. On three occasions I have visited the historic and beautiful Mount Vernon. There were also two works by H.H. Brownell, The Old World - Ancient and Modern, and The New World - North and South America; both dated 1856, and full of coloured illustrations of good quality. Also, Catlin's North American Indians, Philadelphia, 1860. (A pirated edition, I suspect.) It had coloured and other illustrations. Then there were:



Young People's Bible History, 1874; Wood's Bible Animals, 1867; Goldsmith's Miscellaneous Works, edited by Washington Irving; and somewhat later Withrow's History of Canada, 1884, and Daniels' History of Methodism, 1887. I must not forget Samuel Rogers' Peems, Felicia Hermans' Poems and The Language of Flowers, all dated 1851. There were others, too; but the above I still have in the handsome old bookcase which I saw my father construct.

I remember also reading Dickens' Oliver Twist and Old Curiosity Shop, the Arabian Nights, Baron Munchausen's Adventures, and Artemus Ward - His Book. Just where they came from I cannot say, but suppose they were loaned by some of our companions.

I do not recall that I had any special ambition at this time. At school I like to write compositions, and sometimes I fear I tried to "spread myself", as I remember seeing the criticism written beside a portion of one of my literary efforts -- "away from the subject". I liked to examine new inventions. My father was a clever mechanic and I often watched him at his work. At times I helped when an extra pair of hands were useful. I knew what everyone of his splendid set of tools was used for. If any person brought him an object which was broken or out of order he could fix it, and he taught and encouraged me to make things.

He was not highly educated but was interested in the history of his country and of the world. He was an intelligent and conscientious citizen. His father was a Tory, or Conservative, while he decided to be a Reformer, or Liberal. The cause of his changing sides, he told me, was the disgraceful happenings in 1849, just after the new union of Upper and Lower Canada had



secured real responsible government; and I think any person who reads the history of Canada for that period will not find fault with him for the youthful decision which he then made. On April 26, 1849, the Governor General, Lord Elgin, who was son-in-law of Lord Durham, proceeded in state to the Parliament House in Montreal to give assent to the Rebellion Losses Bill, which had been passed by both the Legislative Assembly and the Legislative Council. When he was leaving the building, he was assailed by a well-dressed mob which threw stones and rotten eggs at his carriage. In the evening the Legislature met again, but the mob smashed windows, broke into the chamber, piled the desks and other furnishings in the middle of the room and set fire to them. Further, they prevented the watchmen and servants from putting out the flames, so that the Parliament House, with its valuable library, was completely destroyed.

#### Superintendent of Sunday School

My father was a religious man, and a short time after we moved to Unionville a députation came to our new home and made him a presentation of a beautifully bound volume of W. Morley Punshon's Lectures and Sermons, Toronto, 1873, with the following inscription

Presented to  
C. H. Chant by the friends of the  
Hagerman's Corners Sabbath School  
as a token of Esteem for his  
efficient services as Superintendent  
for six years.  
July 11, 1873.

I may say he organized the Sunday School at the Unionville Methodist Church and was its Superintendent for over twenty years.



It still lives on, 73 years after.

Usually at each session of the school the superintendent would conduct the opening exercises, after which the teachers would spend a specified period in teaching the lesson to their classes. At a signal on a bell this would cease and all would come to attention. Then the superintendent would give a short review of the lesson, in doing which he liked to use either a poster-like printed sheet purchased by the school or a home-made one. In the latter the wording would be taken from a lesson help and the lettering would be in coloured crayons on a large sheet of white paper. For a while he did this himself and then, as I liked writing and printing, he got me to do it. For several years I prepared these sheets -- indeed until I left home. All these experiences have influenced me through life.

When the family moved to Unionville there was no dwelling house available and to supply this need the upper story over the shop was remodelled, papered and plastered, and made very comfortable. There we lived upwards of two years, while a separate residence was being built. This was completed in 1876 and was occupied continuously by my family, until my father died October 14, 1915, and my mother passed away September 30, 1930, in her 91st year. Then it was sold to a cousin, Archie Lunau, and after his decease it was purchased in 1942 by the Township of Markham, to be used as offices for the municipality.

#### Living over the Shop

Many things happened while we lived over the shop. In 1874 or 1875 Elder Hawkins and his band of jubilee singers,



from the vicinity of Chatham, visited the village. That was the first time the people of the community heard negro spirituals and they were simply entranced with the simple, plaintive or joyous, appealing music. Throngs went to hear them. I remember the occasion distinctly, and whenever I hear one of those familiar melodies, such as "Swing low, sweet chariot", "Go down, Moses", &c., I always note any variation in the words and tunes as compared with those I heard so long ago. Several of the singers stayed with us during the visit and the entire company would gather of an afternoon in our "parlor" to rehearse their songs to the accompaniment of our seet-toned Estey organ.

The famous U.S. Centennial Exhibition was held in Philadelphia in 1876, when I was eleven. My brother asked me how old I would be when the next exhibition would be held. I replied twelve. Of course I was corrected! Soon after the close of the Exhibition a large volume, with many illustrations, describing it was published. My father bought a copy and we children carefully studied it. I could picture in my mind the whole exhibition and could name the chief exhibitors.

A special feature of the quiet life in the eighteenth-seventies was the picturesque spinning wheel, of which my mother was an expert operator. She used it freely in our spacious living quarters. Some of you may not have seen one of these machines - at any rate, not in actual use. There is a pleasing picture of one in C.W. Jefferys' "Picture Gallery of Canadian History", volume 2, page 230.



The foundation or framework of the machine was a heavy plank, about four feet long and eight inches wide, supported on three spreading-out legs, two at the rear end and a longer one at the front. Near the rear end a strong post about two and a half feet high was mounted vertically and into this, near the upper end, was inserted the iron axis on which the wheel revolved. At the other end of the plank was another post which carried the spindle. This was a steel rod perhaps a foot long and a quarter-inch in diameter. Securely fastened on the rear end of the spindle was a small pulley. The big driving wheel was about four feet in diameter and it had a wide rim. The belt, which was a heavy flexible cord, passed around the big wheel and the little pulley, and when the wheel was given a smart rotation the pulley whizzed round at great speed and uttered a high note.

A bundle of carded wool lay on the frame of the machine near the spindle-post. These cards of wool were composed of wool combed into straight fibres and then rolled together into what looked like tubes half an inch in diameter and fifteen or eighteen inches long. They had been made at a regular woolen mill, of which quite a number existed in the township. An end of one of these cards was made fast to the spindle and the operator held the other end in her left hand as she rotated the wheel with her right hand and at the same time walked away from the spindle. The spindle gave out its little song and the wool was twisted into yarn. Then the operator turned the wheel slowly and wound the yarn on the spindle as she walked back to the spindle. Another card was now attached to the free end of the yarn and the operation was repeated.



When the spindle was full, the yarn was wound from it onto a big bobbin standing near-by, which was rotated by hand, and when the proper number of rotations had been snapped off, as indicated by a counter driven by a worm-wheel, the yarn was tied into a skein, and the process was continued. After this the yarn was dyed, and then the younger members of the family wound it into balls, ready to be knitted into socks, mitts and other warm garments.

### Agricultural Machinery

Another thing that interested me was machinery, especially that used on the farm. The machine age was coming fast! Hart A. Massey made farm implements at Newcastle, Ontario, as early as 1847. He transferred the business to Toronto in 1870, and took over the Toronto Mower and Reaper Company and produced a mower that was called the Toronto Mower. This machine I thought very ingenious. In it the cutting-bar could be raised almost to the vertical position while the knife continued in motion.

About 1870 grain - wheat, oats, &c - was ordinarily cut by a reaper, and when enough to make a sheaf had been collected on the table of the machine, the driver by moving a lever discharged it onto the ground. Harvesters walking behind the machine would gather the sheaf in their arms and bind it by means of the straw itself. I remember hearing of two strong and experienced men who could keep up with the reaping machine, but this was very exceptional. Usually from four or five were needed, and indeed the number would depend on the heaviness of the crop.

The first mechanical binder separate from the reaper,



was exhibited about 1876 by John Watson of Ayr in Waterloo County in a small field of grain beside the residence of Mrs. Davison, Senior, in the north part of the village. It was driven like a hay-rake following after the reaper which cut the grain. When it had collected enough for a sheaf, the driver tripped a lever and the sheaf was bound with wire. I do not think John Watson manufactured the machine, but only demonstrated its capabilities.

In the 'seventies' the Patterson Agricultural Implement Works, located about a mile and a half west of Richmond Hill, was in active operation. The Pattersons, I learn, built a saw mill on a branch of the Don in 1854 and the implement works farther to the south some years later. They used to bring their implements on big 'flat-top' wagons to Unionville to be shipped by T. & N.R. northward and by G.T.R. via Scarborough Junction eastward. The firm, like so many others in the country - and in this case at the expiration of a bonus period - sold out to a larger company and the business was transferred to London, Ontario, in 1886 or 1887. Another thing I recall was the migration of the passenger pigeons. It was while at the public school that I saw them, probably in 1875 or 1876. I remember them flying not very high but in great numbers, wave after wave. Now absolutely extinct!

#### Last migration of wild pigeons

Ernest Thompson Seton in his autobiography entitled, "Trails of an Artist Naturalist", p. 145, (N.Y. 1940) says that he saw the last great flight of wild pigeons northwest about April 20, 1876.



My two brothers, Herman and Havelock, six and two years, respectively, older than I, were continually making machines, or mechanical puzzles or other gadgets, always with my father's approval and assistance. Among other things there was a fountain we had. The source of the water was a barrel on a platform at a height of about ten feet. As there was no iron pipe to be had, the pipe to carry the water was made from two long wooden strips channeled out lengthwise and then fastened together with white lead so as to be watertight. This lead from the barrel to the ground and ended in a small opening through which the water spurted on a bed of flowers. It worked all right and although the water had to be laboriously carried up continuously to replenish the barrel we all thought it worth while. Moreover it did not cost as much to put on an exhibition as at the famous fountains at Versailles, which I saw in 1925!

After the family moved into the new house Herman continued to occupy his room over the shop. In the dark winter mornings he could not tell just when to get up, so he rigged up a contrivance by which when one pulled downwards a wire in the kitchen this motion was carried by a wire fifty feet long which ran from the kitchen across to the bedroom, and there released an arm, bearing a match, which had been pulled back against the tension of a coil spring. The arm, upon being set free, swung forward rubbing the match on sandpaper which ignited it and it lighted a lamp on a bracket. At the same time a bell was rung.

#### My Eldest Brother

This same brother became a very skilful and resourceful workman. Before he was twenty he constructed a big clock with



wooden wheels, some a foot across, which kept excellent time. It was exhibited at Markham Fair in 1879. Seventeen years later, in 1896, he built for me a superior clock in a beautiful tall walnut case. In 1921 he made some improvements in the works and added a striking section. It has been an ornament to my home and has been running perfectly ever since.

I must be pardoned if I speak further about my brother Herman. Soon after completing his apprenticeship he left home to take employment in the village of Teeswater, but the work was rather coarse compared to what he was accustomed to and before long he moved on to the town of Clinton where he obtained a position in the Doherty Organ Factory. In a slack period he went to Seaforth, and for a short time back to Unionville in partnership with his father. However there was not enough work for the two of them and he returned to Clinton. In a few years he was superintendent of the factory. He took instruction in a correspondence school and practised with a lathe and other machine tools at his home and became an expert machinist. He also studied steam and electrical engineering, passed the requisite examinations and was given charge of the steam and electric plant of the factory. Finally, when the town installed a water-works system and organized a board to introduce the Ontario Hydro-Electric Power he was made Superintendent of Public Utilities. He died in 1929 at the age of seventy. It gave me great satisfaction to hear him publicly described as one of the town's distinguished citizens. The great men do not all live in foreign lands.

My brother Havelock spent some years learning the cabinet-making trade at home, but he was <sup>a</sup> attracted to the railway, one of



his chums being a son of the station agent. They practised at home and both became expert telegraphers. He entered the service of the Midland Railway August 1, 1883, and retired from the Grand Trunk Railway March 1, 1929.

## II THROUGH THE HIGH SCHOOL

About September 1, 1879, at the beginning of the autumn term, I entered Markham High School. According to the corporate seal of the Board of Trustees of the "Markham Grammar School" it was instituted twenty-one years earlier, in 1858. During the preceding session the school house had been destroyed by fire. I remember seeing two of the Unionville students of the high school ("Trum" Crosby and "Jim" Keller) returning by buggy from Markham singing hilariously that there was no school, and shouting that the school house had been burned down. I think this was in May, 1879. At any rate there was not time during the following summer to erect a new building, and the school was now held on the top floor of a three-story brick building occupied by Charles S. Carleton, a well-known merchant of the village. It is still standing, at the corner of Main and Joseph Streets.

### The School House and its Teachers

The school floor was reached by two long flights of steps, which were taken by the students at high speed, but I do not recall any accidents. This upper flat was divided into two rooms, the larger one for the Principal, the smaller for the Assistant Master. These were provided with long narrow tables arranged crosswise in the room, with an aisle down the middle, and the scholars sat on settees, or benches with backs, placed along one



side of the tables. The furnishings were intended to be only temporary and were of bass-wood, easily carved or otherwise defaced by the jack-knives of the boys.

There were two teachers, the headmaster, Edward T. Crowle, and his assistant Allan McLean. The former, I believe, was a Cornishman and he had a slight bodily deformity - he was a hump-back. He was said to be a Ph.D. of the University of Giessen, Germany. On official documents he signed himself M.A. Of course we youngsters did not know anything about German universities, but it was rather odd, some thought, that there were no classes in German in the school. Some twenty years later I spent some time in Germany and actually visited Giessen to see a scientific friend; and as I then looked back on my high school days I was surprised at the entire absence of German spirit or method in our school. I may say that it was at Giessen that the great Chemist Liebig (1803-1873) did his most important work. There he established the first chemical laboratory of the modern type. Just when Dr. Crowle was at Giessen I do not know. I remember one of the students (named Spence), a little older than I, writing some doggerel verse about the headmaster and his Ph.D., but I suspect he was resentful at not obtaining some favour which he sought, and took that way of 'letting off hot air'. Dr. Crowle was sole teacher of the school from its beginning until 1864, and became its head <sup>o-</sup>agin in January 1873, when it had become a two-master school. (see Hodgins, "Schools and Colleges in Ontario", vol. 2, p. 54, 1910). He was very highly respected.

As illustrating the loyalty which some persons bear to the place of their birth, I may relate that about 1897 'Bob'



Fitzsimmons, who was a Cornishman was battling for the heavy-weight boxing championship and Dr. Crowle, although a respected lay-preacher of the Methodist Church, could not wait to learn the result by the next issue of the newspaper, but walked almost a mile to the railway station to ask the agent to get the news by telegraph.

The other teacher, Allan McLean, was Scottish, although I am not sure he was born in Scotland. I believe that at this time the Regulations of the Department of Education required teachers in the high schools to hold not lower than a First Class certificate, but Mr. McLean's was only of the Second Class. However, he had received his appointment to a high school before the Regulation came into force and was allowed to continue teaching in the high school. It should be stated that Mr. McLean's education had not ended with securing a teacher's certificate. He was ambitious and endeavoured to master new subjects as they were prescribed for study and was able to keep well ahead of his students.

Dr. Crowle taught Latin, Greek, French and also English literature, grammar and composition. Mr. McLean had Arithmetic, Algebra, Euclid, History and Geography, and the scrap "science" which was then available - brief look into Statics and a briefer consideration of Chemistry. I should say that both Dr. Crowle and Mr. McLean were capable teachers although neither was a broad scholar.

In 1879, according to my recollection, there were some 65 students in attendance, about one-third being girls. The boys ordinarily took Latin, the girls French, although one might avoid



either by taking the "science" option. Each student had his own seat in the principal's room, those studying similar subjects being seated near together. At the proper time a class would move into the assistant's room for mathematics or other subject, a language class would take seats on settees at the front of the principal's room, and the remaining students would stay in their seats doing assigned tasks or preparing the lessons for the next day.

#### Walking to School; for Good Health

My home was fully three miles from the school and our village contingent, usually three or four boys, would walk that distance before nine in the morning and back after four in the afternoon. We would walk half the way directly east on the railway and then, as the line curved away to the north, we would take a short-cut through country lanes and across farms, incidentally, in the autumn, 'annexing' some apples or grapes on the way. Other students converged on the school from every quarter of the compass, one from the south trudging six miles night and morning. Appropriately his name was Mann. Another, whose father was dead, assisted his mother and sister to operate a cheese-factory in the morning before he began his three-mile tramp from the east. His name was Albert R. Raymer and I shall speak of him again. This we did every school day in all sorts of weather and I remember hearing my parents remark that my health was never better.

Of course some of the farm boys, or girls, might drive by horse and buggy, and occasionally one might go by rail; but



the railway time table was not suitable and the Markham station was a long distance from the school. Many years afterward, when the number of students from outside points had increased greatly, the times of the passenger trains were adjusted so as to carry the students back and forth. It should be stated also that boys and girls from more distant points found comfortable boarding-places in Markham village and were able to prosecute their studies with comfort and convenience.

For a few months in the session 1881-82 I was driven to school and home again. In this case W.J. Thomson, using the horse and buggy of his father, a merchant of Buttonville, drove Henry Brown and himself the six miles to Markham and picked me up on the way. Thomson and Brown both passed the Intermediate examination in 1882 and then attended the York County Model School in the Autumn, at its last session in the village of Yorkville, which lay just north of Bloor Street at Yonge Street. Next year that village was annexed to the city of Toronto. Some years later Thomson became principal of the Brown Public School on Avenue Road in Toronto, and held that position capably for many years.

Of course the Unionville walking students frequently varied in numbers and persons; and as we continually traversed the same route we observed the trees and birds and animals, and practised throwing stones at various targets - but doing no damage. We also had numerous discussions but I do not remember anything very inspiring in them. We were pretty youthful, lacked maturity. One of the party for some months, named 'Tone' Eckardt, was quite athletic and did various stunts. He could throw a ball



or a stone the farthest and straightest, never missed a 'catch' which came <sup>e</sup>near him, and could 'bat' with a broom-stick as well as the rest of us could with a cricket-bat. One day he actually lifted from the ground an iron rail of the railway which was lying beside the track. He was sixteen then. Those rails I find were 40 pounds per yard and I presume were as much as 24 feet long or 320 pounds in weight. This is small indeed compared with those in use to-day, which in some cases are 136 pounds per yard, but the lad's feat was outstanding. If he had been born sixty years later he would certainly have been on a major baseball team, receiving a fabulous salary.

#### The Subjects we Studied

On entering the high school I began the study of Latin. Our Textbook was "First and Second Latin Books", by Thomas Kerchever Arnold, late fellow of Trinity College, Cambridge. The name suggests the famous headmaster of Rugby (1795-1842) but I am not aware of any family relationships. The volume I used was of the Fifth American Edition (1847) from the Fifth London Edition. It was a well-prepared text, carefully graduated as to difficulty and I found it easy. Indeed we proceeded slowly and steadily and with little serious effort. By the end of the school year I was ready to read Cicero's "In Catilinam" and Virgil's "Aeneid", which were prescribed by the Department of Education for the Intermediate Examination in 1881.

During the session of 1880-81 we occupied the new school building. Of course it was a great improvement on the quarters we had the year before. The school grounds were large enough for



games, but at that time sports did not figure so prominently in school life. We went to school primarily to secure an education. Indeed the students who came from outside the village did not have much time for games. Baseball was the favourite.

The building had two class-rooms and there were ante-rooms for the teachers and the students. It was all arranged in a simple way. Each student had his own seat and shared a desk with his neighbour.

The class in French was composed exclusively of girls, except during one session when there was a young man named J. W. Milne - Jacques de Milne, he signed himself. He was a little older than the others and had come in to brush-up his French and improve his standing as a teacher. Milne was a clever artist and skilful in carving with his pen-knife, - and, I believe, was the only one of the students that smoked!

In mathematics I had a certain facility but it did not help me much in arithmetic. Usually there would be assigned for a lesson five problems from a printed list. Generally they required considerable thought and also much time to make the numerical calculations. As a consequence the student seldom could do all; indeed frequently he became disheartened and did not complete a single one. I was not surprised when, years afterwards, arithmetic was dropped from the course of study.

During the first year we had practice in English Grammar and composition and spent much time in 'analysis and parsing' of various types of sentences. To this last subject I think we gave too much attention, although it tended to accuracy in understanding.



Then in the second year we studied Scott's "Lady of the Lake" and Addison's "Sir Roger de Coverly", which were the texts prescribed by the Department of Education for the Intermediate Examinations of 1881.

I wonder what proportion of the boys and girls, upon entering the high school, have read understandingly any long poem? I have to confess that it was some weeks after I secured an annotated edition of the "Lady of the Lake" before I realized that there was a charming romance wrapped up in it. This was a real discovery! Should the teacher enlighten the student when he begins a new study, or should the latter be left to find out these hidden things for himself? The wise teacher will realize what is best to do. My study of English Literature this year opened my mind to what was in store for me.

In July 1881 I wrote on the Intermediate Examination. This was accepted as the non-professional qualification for second class teachers, and it had to be passed all at one time, not by bits. In assigning standing on the examination the subjects were considered singly, in groups, and also as a whole. If the candidate obtained 30 per cent. on each subject, 50 on each group and 60 on the whole he was awarded Grade A. For grades B and C the percentages were lower. Since that time the examination has been broadened and has been made the same with Pass Matriculation, but I do not think the standard of scholarship is as high as it was sixty years ago.

#### Distinguished Fellow students

Two of my friends who obtained good standing on that Intermediate examination were T.A. Gibson and A.R. Raymer, The



former continued one year longer at the Markham school. The latter, who was born December 1, 1862, entered at once the School of Practical Science which had been given a home in 1878 in the modest "Old Red School-house" on the University lawn. It became the Faculty of Engineering of the University of Toronto when the latter received its new Constitution in 1906. Raymer had superior mathematical ability and in 1884 obtained his Diploma in Civil Engineering. He served as a construction engineer on the C.P.R. in Ontario and also its "short line" through Maine. In 1920 he became Chief Engineer, and in 1925 Assistant Vice-President, of the Pittsburgh and Lake Erie Railway. He died August 10, 1931, at Beaver Pa.

After spending two years at the high school, and having passed the Intermediate examination, what should I do next? I was sixteen. My father thought I was too young to 'take a job' and that I had better continue my education.

As I look back on this epoch of my life I think I was very fortunate. Here I was, the fourth in the family and the three before me had not been privileged to attend the high school; I was the fortunate one. My ability was not greater than their's. It was simply the order in which we were born -- the younger the favoured one.

I had no definite object before me and hardly knew what matriculation into the University meant. I obtained the University of Toronto curriculum and found that, following the course I had taken thus far, I should naturally continue Latin and begin the study of Greek. Besides the Pass course for the B.A. degree there were Honour courses in Classics, Mathematics (and Physics), Modern



Languages (English, French and German) and Natural Science.

Philosophy was entered through the Pass course. I decided to try for honours in Mathematics; and as English was so arranged that separate honours could be taken in it, I determined to try for that too. The chief addition for honours in English over the prescription for pass was the study of Shakespear's Richard II, and that was attractive to me.

### In the Upper School

So at the beginning of September 1881 I started in the Upper School at Markham. Indeed I do not recall just how the school was organized into forms and divisions; but the names Lower School, Middle School and Upper School seem natural and self-explanatory. If a student is in the first year of Upper School you have a comparatively clear idea of how far he is advanced in his secondary school education, while Grade 7 or 10 give no such indication. Similarly the name Grade School to me is meaningless.

There are two matters which I shall refer to here, - before I proceed with my Upper School experiences.

No instruction in penmanship was given in the high school, but I took considerable care with my writing. At about this time there were numerous "business Colleges" in the various cities of the country, which made a special feature of the so-called Spencerian style of writing. This, I believe, owed its vogue chiefly to an American named Spencer. (see Encyc. Brit., vol. 4, p.617) It was distinguished by its fine shading and graceful curves, which were often combined into the drawings of birds and



<sup>Gibson</sup>  
scrolls. Bigson and I took much interest in these exercises with the pen, but I must acknowledge that when I wanted some inscription particularly well done I would ask him to do it. I have still quite a number of such examples in my possession.

Then I had a desire to learn shorthand and perhaps become a newspaper or court reporter. In some way I learned about Isaac Pitman and his invention of Phonography. It appealed strongly to me. I found out that if I ordered the instruction books direct from Pitman's Phonetic Institute in Bath, England, I could obtain them for one-third the ordinary price. This special offer was made with the object of eliminating the several variations of Pitman's system which had been developed in the United States. For a dollar one could buy all the little books and pamphlets required to learn Phonography. I interested several of my friends in the subject and sent orders to Bath about half-a-dozen times, and afterwards had much pleasure in corresponding in shorthand, mostly on post cards, with my friends who had taken it up. I enjoyed the contact with England and still have some of the letters and post cards received from there, all written in shorthand.

I received no lessons in the Pitman system at all. In the summer holidays I faithfully worked over the carefully-developed exercises in the different text-books and in the Phonetic Journal for which I subscribed. Also, I would crouch in the end of a church pew and attempt to 'take down' the sermon by a village minister who spoke very deliberately. In this way I became fairly proficient and reached a speed of over 125 words a minute. A few years later I had the privilege, for some months, of listening to



the debates in the House of Commons at Ottawa, and I did admire the way the official reporters were able to handle certain members who swept along with a torrent of over 200 words a minute!

Nearly always there was a Unionville correspondent who sent local news-items to the long-established weekly paper at Markham. Of them all I think Albert Crosby, who wrote under the pen-name of "Woodside", created the greatest interest. He described various social occasions in the lively and personal way. I remember, in particular, a "wooden wedding" (fifth-year anniversary) which he reported, giving imaginary interviews with some of the guests, in which they expressed their opinions freely. It was about this time in my education that I began to send in contributions to the papers, chiefly of incidents of general interest. I suppose I liked to see my own compositions in print and it gave me considerable amusement as well. I may refer to this matter again, but must get back to my high school experiences.

In September 1881 I began the study of Greek, using at first Harkness's "Introduction" and, later, Curtius' "Smaller Greek Grammar". In the class there were only two - Gibson and myself. I also continued Latin, using Arnold's "Latin Prose" and reading the texts prescribed for Pass Matriculation - Caesar and Virgil - and for practice I read Horace and Ovid, required for honours. I always enjoyed Latin and Greek. I became fairly proficient in writing Latin Prose, but never felt so sure of the Greek. During the session 1881-82 we moved steadily along in mathematics which consisted of Euclid's "Elements", Books III-VI, Algebra to the end



of the Binomial Theorem, and Trigonometry to include the solution of triangles. For text-books we used Todhunter's "Euclid", Todhunter's larger "Algebra", and in Trigonometry, Hamblin Smith and Joseph Morrison. Dr. Morrison was principal of the Newmarket High School and his book was published in Toronto. He was a good mathematician and shortly afterwards was appointed to the staff of the U.S. Naval observatory in Washington, D.C.

#### Changes in the Markham School

During the summer of 1882 a great change was made in the Markham High School. In 1877 the extensive wagon factory of Speight and Son, Established in 1840, was destroyed by fire. This was a serious blow to the village. The Speight Wagon had a wide reputation. I heard a member of the firm say that the farmers from far and near regularly came back at the end of about twenty years for a new wagon. The business could not be allowed to cease and the factory was rebuilt within thirty days. In order to carry on the business a joint-stock company was organized. A few years later Dr. Crowle became secretary of the company and that required his retirement from the school and the appointment of a new headmaster. The trustees chose Dion Cornelius Sullivan, who was described as an LL.B. of Trinity College, Dublin, and who, I believe for some years had been engaged in publishing a weekly newspaper in Bruce County, Ontario.

Well this would evidently cause some interruption in the even tenor of my schooling and I hardly knew what to do about it. Gibson, who boarded in Markham, decided to transfer to the Toronto



Grammar School, later known as the Jarvis Collegiate Institute, where there was a large staff to serve him. However, I started again at Markham in September 1882, but it soon became evident that my prospects for obtaining the tuition I desired were very poor. The Lower and Middle School classes required most of the headmaster's time, and I was the only student in the Upper School and could not expect to receive much attention. Moreover I thought Mr. Sullivan was "rusty" in the subjects I was studying and indeed was finding it difficult to establish himself as a teacher and to keep order in the school. He used to wear a wig and the boys (especially one from Unionville) soon found he could be imposed upon.

#### Incidents under the new Headmaster

As I have indicated, the new headmaster's path was not strewn with roses. He was good-natured and was anxious to show that he was able to teach all the subjects in the curriculum and was able to answer whatever questions might arise. He was an easy subject for a practical joke and I must relate one ridiculous incident.

The main room of the school was poor acoustically, there was too much echo or, more properly, reverberation. In an attempt to improve this condition, about a dozen wires, arranged parallel to one another and perhaps two inches apart, were stretched from the top of a window-frame on one side of the room to the top of the corresponding window on the opposite side. They looked like the strings of a giant musical instrument, and were about ten feet



above the floor. It may be remarked that the use of stretched wires to reduce the reverberation is of no value whatever.

In the high school there was a somewhat dilapidated old unabridged dictionary, compiled by Worcester, I believe. One day at noon one of the boys managed to hoist the big book up on the wires. When Mr. Sullivan returned he noticed it, and when the scholars had assembled he asked who put it there. The mischief-maker promptly stood up! he said he wanted to put the old book out of the way. "Take it down!" said the master. The lad went outside and got a baseball bat, and, standing on a desk, he put one end of the bat under the book and gave a mighty heave upwards. The book came down with a tremendous crash on the floor. The master was horrified but could say nothing as the boy had done just what he was told to do.

The operation of the school under the new regime was very unsatisfactory to me, and after an ineffective autumn term, in which we often wished for the return of the previous headmaster, I decided I should try another school.

During this last term at the Markham School there occurred a rare and important astronomical phenomenon, namely a transit of the planet Venus across the face of the sun. This was on December 6, 1882, The last previous transit was on December 8, 1874, while the next pair will be on June 7, 2004, and June 5, 2012. Great preparations had been made to observe the transit of December 6, 1882, since it was hoped, from the results obtained, to deduce a more accurate value of the distance of the earth from the sun. The sky in Canada was not very clear and the observations were of



little value. I remember the day. There had been a snowfall and as it was near the end of an unsatisfactory term I did not attend school that day and I really forgot the transit! But Mr. Sullivan did not. He was interested in such matters. I was informed that during the transit, which lasted some hours, he gazed at the sun through smoked glass, with and without his spectacles, but c could not detect the planet. I was sorry I had not exerted myself to go to school that day as it was a really notable occasion, which I learned to appreciate more fully in later years.

My most exciting experience while attending the high school occurred during my last term at Markham, (in the autumn of 1882), and involved a young lad who lived about three miles east of the village. He was in one of the lower classes and his seat was about ten feet away from mine. The first letter of his surname was H - ns. His handwriting was very ragged and one day "Hank" Speight remarked that his signature looked like "Scruggins" and by that name he was known thereafter. H. had kind and devoted parents who had loaded him with three unusual Christian names, probably borrowed from relatives and indicating family pride in the child. But the boy lacked moral courage. He dislike being behind others in his class. At home his mother helped him solve his arithmetic problems but at school her aid was not available and he had to be 'on his own'.

One day, I think in the spring of 1882, H.'s class was undergoing a written test in Latin, and with some of the questions he was having difficulty; so he pulled his text-book out from his desk, opened it at the desired page, and placed it upon his knee.



While glancing down and getting the information he wanted the book fell on the floor. All the boys around him snickered and grinned but poor H. was very uncomfortable. The teacher did not say a word; he was busy at something else, but I think he grasped the situation.

A few months later a more serious incident occurred. The boys from Scarboro' Township boarded in Markham village but spent the week-ends at home. One of them, named Clark, brought to the village a 22-calibre, 6-shot revolver which was out of order, intending to have it repaired. He showed it to H., who offered to take it home to have a handy neighbour put it in good order. Clark agreed and H. took it home, and a day or two later brought it back to school. He told Clark that if he (Clark) would load the gun with cartridges and let him fire them off on the way home he need not pay anything for the repairs. Clark was agreeable and filled the six chambers with cartridges. Then at noon. H. went to a hardware store and bought a box of cartridges!

Towards the end of the afternoon, when all were becoming a bit restless, the school was startled by a sharp explosion, which was followed by dead silence. On looking about we saw smoke rising at H.'s desk, and after a few minutes the reaction from the state of tension led to a general outburst of laughter, or rather giggling, which was hard to control. The headmaster (Sullivan) saw the smoke and asked H. to go out with him into the ante-room. After some time the two came back and H. went to his seat. The headmaster then addressed the school. He said that Mr. H. had brought a revolver to school in order to have it repaired in the village. This had been done and he was about to take it home, but



when transferring it from his desk to his school-bag it was discharged. The master assured the students that it was purely accidental, that Mr. H. had no intention of injuring anyone.

While H. and the master were out of the room, some of H's neighbours looked around the desk and the floor to see where the bullet had struck, but could find no trace of it.

Then school was dismissed and as we stood around talking about the matter H.'s desk-mate came up and told us that the bullet had entered H.'s leg! One of the boys went with him over to consult the doctor, who examined the leg, gave suitable treatment and decided not to operate at that time. By now the wound was painful and the doctor drove the boy home.

After a week or two H. returned to school, and the bullet was never removed from his leg. This episode caused H. to fall behind in his classes.

I left the Markham School at the end of that term, in December, and never saw the youth again. I learned that a year or two afterwards he was employed as a handy boy in a law office in Toronto; but his execrable handwriting, in that typewriterless age, must have limited his usefulness. Sometime later he was attached to one of the many parties at that time surveying the great North-West in order to open it up for settlement, and he lost his life by drowning!

A few years afterwards one of my old Unionville mates had occasion to call at H.'s old home in the easterly part of the township, and after transacting his business he 'casually' remarked that he used to know a student of their name at Markham High



School. He was not encouraged to pursue the subject further.

St. Catharines Collegiate Institute

I had an aunt living in St. Catharines, and the Collegiate Institute there had a splendid reputation. Indeed there were four or five Institutes, well distributed throughout the Province, with ambitious headmasters endeavouring to build up good names for their schools by preparing large classes of students for the various University and Departmental Examinations. They would publish the results and offer special inducements to advanced students.

The school at St. Catharines had an honourable history. It was established as the Grantham Academy and began its actual teaching life on September 14, 1829, at which time St. Catharines was only a village. In 1882 its headmaster was John Seath, and his two chief assistants were John Henderson and W.J. Robertson, an able and famous triumvirate. Mr. Seath made a specialty of preparing candidates for first-class certificates for teachers and for honour matriculation and honour first year at the University.

So to St. Catharines I went at the beginning of January 1883. This was my first venture away from home and I carried my luggage in a brand-new leather-bound trunk which my father had ordered for me. Without delay I got started in my work and I soon found I had made no mistake in going to that school. Messrs. Seath, Henderson and Robertson gave me much personal attention. At Markham I had hardly begun the close study of Shakespeare, but here I was in the midst of a large class reading Richard II. We considered every sentence and analyzed carefully every difficult phrase, and looked up all the cross references. Then as the time for the



Matriculation examination approached (held before the Departmental examinations) special books, such as Dowden's "Mind and Art", were put in my hands and I was asked to write essays on the various characters.

In Latin and Greek, although I was not writing for honours, I prepared the subjects as though I was. I would work over past examination papers, and would make up a list of things that gave me any trouble; these I would take to Mr. Henderson who would sit beside me and discuss them by the hour.

But it was in Mathematics that I received the greatest drilling and reviewing. I worked through the texts with care but the significance of every portion was impressed by working problems and exercises taken from other books and from former examination papers.

The three men I have mentioned were extremely well informed in their subjects and were excellent teachers, although they differed greatly among themselves. Each had a distinctive individuality. I did not lack training. When June came round, the time of roses and also of examinations, I felt reasonably well prepared.

#### Writing on the Matriculation Examination

At that time the Matriculation Examinations were all held in the old Convocation Hall which formed the north-east corner of the well-known Main Building of the University of Toronto. Where should I stay when I went over to Toronto? Round the 80's when the children in a country family were ready to attend a high school, it was quite common practice for the master of the house to rent



a modest dwelling in the city where the mother, or some other experienced person, would keep house while the children attended the schools suited to their needs. Frequently other persons from the same part of the country would also be provided with a home. Such a house was kept by a family from the north part of Markham Township and one of the boys had attended Markham High School when I was there. He graduated B. A. at the University of Toronto in 1887; a younger brother graduated in 1890, my own year. They both became distinguished ministers of the Presbyterian Church. The house was located at 70 Baldwin Street, corner of Huron Street, which was then in a good residential part of the city and very convenient to stores and schools. Into this comfortable home I was received by the kindly mother.

This was in June 1883, and I may relate an incident which will indicate the change in the city of Toronto since then. Two girls, friends of the family, who were stopping at a house on Bloor Street west, at Bellair Street, which is a short street running north from Bloor Street, just midway between Avenue Road and Yonge Street, came down one evening to make a call at the Baldwin Street house. About 10 o'clock they wished to go home and one of the boys and I accompanied them. As I recall it, we walked north on Huron Street almost a mile to Bloor Street and then east about half a mile on Bloor to Bellair. Bloor Street at that date was a waste of sand and it formed the northern boundary of a wooded area which included Queen's Park. There were a few buildings on its south side, two of them being the original McMaster Hall, housing the Baptist Theological College, and the large



Campbell residence where the Royal Ontario Museum now is. The north portion of this wooded land, especially the ravine between the two buildings named, was a favourite resort for some questionable characters; and as we moved along this part of our way there was little conversation, - rather a tense silence. Now one finds here the Meteorological Office, the Varsity Arena, the Economics Building and the great Museum! The girls safely reached their home, which was that of James Hodgson, for many years Public School Inspector of South York; his family was one of the best known in the village of Yorkville.

Well, I was much impressed with the famous University building and wrote on the examinations held in the Convocation Hall, and I was able to attain good standing in honours. This gave me great encouragement to look forward to the B.A. course at the University.

#### John Seath my Friend

Two more matters regarding John Seath I should like to mention. He took great interest in the Literary Society and it thrived under his guidance. It was a very useful training ground for the students, and the talented speakers and singers of the city were pleased to contribute to the programmes. In the assembly Hall there was a large tablet on the wall on which the scholarships and other honours won by the students were permanently enrolled, and this list inspired those who read it to strive for a place in this record. At Markham this side of our education was altogether lacking. Of course the number of students there was much smaller.

Soon after 1883 Mr. Seath left the St. Catharines school to become Inspector of High Schools and later he was made Superintendent



of Education. For many years he had more power in moulding the educational system of Ontario than any other person. Indeed he was often referred to as the "Czar" of the Department of Education. When at St. Catharines he endeavoured to make that Institute the outstanding school of the Province, but when he became head of the Department he seemed to desire that such brilliant individuality should not be attained by any school. I have heard it stated that he was sometimes harsh in his dealings with teachers and schoolboards, but he was always my friend and if he could be of service to me I could count on his assistance. Every person who was acquainted with Dr. Seath and his work was willing to bear testimony that his own personal interests never entered into the policies that he advocated, but that his only aim was to improve the educational system and thus serve the highest interests of the Province.

### III COUNTY MODEL SCHOOL

#### A Stepping Stone

Thus in the summer of 1883 I found that I had successfully passed the matriculation examination, and I was anxious to take a University course, but I did not have the means to do so. The fees for tuition and the cost of living in the city at that time were much lower than now. In the course for B.A. the ordinary fee was \$20.00 for the college year, and good accomodation was obtainable for \$3.50 a week. My father had been very generous to me when I was in St. Catharines. For instance, I mentioned Niagara Falls in a letter and he at once sent me a special allowance for



a visit to the Falls, before I should finish the term. Sight-seeing then was expensive as there was no free government park. But I simply had to pay my own way through the University - or at least largely so.

The most obvious way to make a little money was to teach some years in a public school. No other method of raising funds seemed feasible. The remuneration in commercial positions was usually low. In some cases the youth had to pay a premium to be allowed to start at the bottom of the ladder, up which one climbed slowly. Teacher's salaries were low too, but when a person was teaching he was also learning, and it was natural for him to look forward to further study. One could think of a career in the Law, Medicine, the Ministry, but an Arts course at the University seemed to me to lead naturally to a high-school mastership, and such was my objective at that time.

#### County Model School

So on Tuesday, September 11th, 1883, I entered the York County Model School. In 1882 and in previous years this school was in Yorkville, but on January 1, 1883, that village became a part of the city of Toronto, and the school was transferred to the Lansdowne Avenue Public School in the village of Parkdale which then was a separate municipality, Dufferin Street being the boundary between it and Toronto. Horse-drawn street-cars were in operation in Toronto and continued so until 1896 when electric cars were introduced in a small way on Church Street. To go by Toronto Street Railway from Parkdale along Queen Street the two and a half miles to Yonge Street required about fifty minutes, and



frequently when I had to go over to Yonge Street on business I would walk home rather than wait for the labouring horses dragging the crowded street-cars. The population of Toronto in 1883 was only 95,000.

I was fortunately able to secure excellent living quarters in the home of A.W. Spaulding, a reputable Toronto dentist who was a distant relative of mine. His office was on King Street, not far east of Yonge, and his house was on Lansdowne Avenue not far from the school.

The budding pedagogues attending the Model School were some twenty-one in number, five being men, the rest women. The head of the School was John A. Wismer, the principal of the Public School, which contained about a dozen rooms. After some preliminary instructions we were divided into small groups and moved for several weeks from room to room to 'observe' how the several teachers presented the subjects to their pupils; and during this time we also received instruction from Mr. Wismer on school management, methods of teaching, school law, and other subjects necessary to understand when we should be placed in charge of schools of our own. This was his first year in this work and it gave him much thought and hard labour. After a sufficient period of 'observing' we were assigned lessons to teach to the various classes.

#### Our Literary Society: Experiments in Science

Early in the session we organized a Literary Society and I was one of a committee to procure an organ for the musical part of our gatherings. This was easily obtained from the well known old firm of Octavius Newcombe and Company at 107 Church Street,



near Queen. It was delivered to the school and the rental charge was only a dollar or two a month. It was interesting to find out the musical ones of the teacher-students and to learn how ignorant of technical music most of us were. I often wished that I had been urged to take a course with a singing-master and had learned to sing by note! Classes for this purpose were not uncommon throughout the country at that time. Our little meetings were of great interest and value to us, who were going out to teach in the country public schools. I have often envied the ability for giving pleasure or comfort which a person has who possesses a good voice or is proficient with a musical instrument.

Besides lessons in reading, arithmetic, geography, and other ordinary subjects, we taught "object" lessons. These were elementary nature studies - of leaves, fruit, birds and animals - and it was interesting to see some of the birds and animals brought as illustrative objects. Those were the early days of instruction in science, which has grown to be so important in the educational curriculum of the province. At that time the science taught in the high schools was very rudimentary.

In the Lansdowne Avenue School there was a separate room where a few chemicals and the simple apparatus for performing some familiar experiments were kept. This indicates further the demand which was growing for instruction in science. In this room some of the teacher - students gathered at the lunch hour, as most of them lived a considerable distance away and there were few restaurants conveniently located in the neighbourhood. As I have stated, my boarding place was near at hand, and I went



home for lunch and could not be present at these 'luncheon meetings'. I told my dentist friend Spaulding about these chemicals and he suggested the experiment of mixing in a mortar some potassium chlorate with a little mercury. He said one might expect a detonation and that was all. I gave this information to my classmate Arthur Eckardt who came from my home-village and who was a leader in the experimenting. At the next meeting he tried the experiment. He put a small amount of the ingredients in the mortar and ground them together with the pestle. After some preliminary 'crackles' there was a smart explosion. Quite a success! Then he put larger quantities of the materials into the little crockery mortar and, holding it in his left hand, he vigorously mixed the ingredients together. All at once there was a loud explosion, the mortar was split into a hundred pieces, and Eckardt looked to see if his hand was still there! It was uninjured.

Another famous experiment, one of the best known in chemistry, is the manufacture of hydrogen gas. The method is described in the old college song:

You take a few pieces of zinc  
And put in your gen-er-a-tor;  
Add water, then plug in the cork,  
And pour in  $H_2SO_4$ .

Well, these instructions were followed, and after the hydrogen had been coming off freely for some time, an attempt was made to light it, as shown in the picture in the chemistry text-book. Immediately there was an explosion and fragments of the glass flask and the acid within it were scattered about. I was not present at the demonstration but I saw where acid and



glass fell upon the forehead and the clothes of one of the men who was observing the performance. That was the end of the chemical experiments!

### Useful Training

The training we received was very useful to the student-teachers. We had been away from public school so long that we had forgotten much that we had learned there. I remember being considerably confused in a lesson I had to teach to a third-book class, on "reduction ascendin". Perhaps some of my readers (if any such there be) may recall some of their experiences in "compound" arithmetic when they had to multiply or divide by  $5\frac{1}{2}$ . However the teacher, a Miss Currey, gave me a slight suggestion which cleared up the difficulty. After that, I took more care to prepare my lesson in every detail. A good example of this sort of problem is found when one has to reduce (say) 201, 562 inches to miles, furlongs, rods, yards, feet and inches, using the table of lineal measure which states, 12 inches 1 foot, 3 feet 1 yard,  $5\frac{1}{2}$  yards 1 rod, 40 rods 1 furlong, 8 furlongs 1 mile. After 'working over' such a question one appreciates the advantage of a decimal system of weights and measures.

Towards the end of our three-months course there was a meeting of the Toronto Teachers' Association and we were recommended to attend it. It was held in the Sunday School room of the Carlton Street Methodist Church which, it may be remarked, was the outstanding unit of the Primitive Methodist Church before it was merged into the Methodist Church of Canada in 1884. To me the most notable feature of the meeting was a reading by Richard Lewis, Principal of the Ryerson public school, and the author of an excellent



manual entitled, "How To Read", which we used in the Model School as a text book. He presented the trial scene from "The Merchant of Venice". First, he wrote on a blackboard the names of the chief characters and explained the setting of the scene. Then he read the scene in a way which could be followed by everyone. The performance impressed me greatly. Indeed a few years later I attempted to repeat this reading before a young people's association in Ottawa. Some years still later it was my happy fortune to marry one who had been a pupil in Mr. Lewis's room at the Ryerson School and she told me that Mr. Lewis never omitted an opportunity to turn aside from any task in which he was engaged in order to have a lesson on Shakespeare with his senior pupils. He made them understand the play and he imparted to them an appreciation of our greatest poet - and, I may add, of English literature in general.

Another incident at this meeting I remember well. One of the teachers sitting near by looked closely at me and then asked if my name was Chant and my first name was Herman! He said he recognized me from my oldest brother (Herman) who attended the Hagerman School around 1870. The speaker was A.F. Macdonald who was a teacher in School Section No. 8 of Markham Township for some years, before I was a pupil there, and who soon afterwards went to Toronto and some years later, became principal of the Wellesley School on St. Albans Street, then the largest school in the city.

"The Maple Leaf for Ever".

During the session I visited the school of which Alexander Muir was principal. I think it was on Gladstone Avenue and that



it is now called the Alexander Muir School. Muir was born in Scotland on April 5, 1830, and came to Canada at the age of three. He composed the words and music of "The Maple Leaf Forever" in 1867, and he was proud to have his pupils sing it for me. Some persons have criticised this song as not possessing very notable words or a very original tune. But few patriotic songs can be rated as first-class literature. (Consider the first line of even "The Star Spanlged Banner"). Also, many are difficult to sing. (We need not go far for examples of this). Muir's song is simple to understand and the tune is easy to sing. It has inspired a love and devotion for Canada and breathes no hatred for the rest of the world. It was quite natural that at the death of the author (on January 20, 1906), there should be a widespread public subscription for a monument to him which ultimately was located on Yonge Street, first at Mount Pleasant Cemetery, but moved farther north when the Subway was built. On Feb. 19, 1952 Alice Agnes Muir Alexander Muir's last surviving child died - She was over 80 years old.

#### Securing a Position

Soon the session's end approached and the kindly principal gave us letters of commendation to assist us in securing positions, which, of course were contingent on our passing the final examination, - but few failed. The certificates received by us were all of the third class and permitted us to teach in a public school three years. After that, if we wished to continue, we should have to pass the intermediate non-professional examination (if we had not already done so, as I had) and then attend six months at a



Normal School in Toronto or Ottawa, and obtain a second class professional certificate, which was valid for life. The Toronto City school board required all its teachers to hold at least second class certificates, and had its own Model School.

We scanned the advertisements in the daily papers during November and December and sent out our applications. The school I obtained was at Maxwell, a small village in the County of Grey; my Unionville friend went to the County of Kent; another to the County of Simcoe; and so on; and many found places in the County of York, not so far from home.

The three-months period was hardly long enough for us to become organized into a class, with officers to keep in touch with the members and preserve a record of our whereabouts and doings in future years. Moreover we were all very busy with our sessional work. I have often wondered where all my class-mates are. It is now (1947) sixty-four years since we separated. My friend Eckardt later obtained employment with a lumber company in Toronto and finally became its manager. Another of the men, about thirty years later obtained a position in the Bursar's Office of the University of Toronto, where he remained many years, I believe until his death. He was the basso profundo of our Literary Society. The two other men also passed away many years ago. As to the ladies, I know of only one who is still in the land of the living. She obtained a degree in Medicine and married a medical practitioner in the United States where she has lived a strenuous and useful life.







Dear Mr. Chant,-

My wife and several of our friends thoroughly enjoyed reading your manuscript.

We want to thank you very much for loaning it to us.

Sincerely,

C.C. Mackechine

Jan. 29, 1950.



Upon informing my parents that I had been selected teacher for the public school at Maxwell, in the township of Osprey, they informed<sup>me</sup> that a cousin named Robert Lunau and his wife had migrated a few years earlier from the township of Markham to a farm not far from that village. I wrote immediately to him and told him when I should be taking my new position and he replied, saying that he would be pleased to meet me at the railway station and bring me to the village. That part of the province was entirely unknown to me and I was<sup>glad</sup> of this easy introduction to it.

As I was starting out to take a responsible place in the world and should be away from home for a considerable time, I carefully collected my clothes and also the books, papers and other articles which I should need (including a piece of rubber belting for a 'strap') and packed them in my trunk.

According to the Government Regulations, school would open on January which was Wednesday. So I boarded the morning train at Toronto on Monday, December 31, and after a ride of ninety-three miles on the Toronto, Grey and Bruce Railway which had recently been absorbed into the C.P.R. system. I arrived at Flesherton station soon after 12 o'clock noon. My cousin was there with his two-horse sleigh, the day was bright and snappy, and<sup>we</sup> started eastward for our destination ten miles away. But we did not go to the village that afternoon; we went directly to my cousin's house on Lot 7, Concession IV of Osprey, which was two miles southwest from it<sup>the "corner"</sup>. The period of daylight was short and darkness came on early. This was the last day of the year and as I lay in bed that New Year's eve, I wondered what 1884 had in store for me. But I had considerable self-assurance,--and was warm and comfortable and went to sleep.

In the morning I stepped outside to sample the fresh air of New Year's day, and the collie dog came running to me from the barn-yard where he had spent the night in the open. He did not seem to suffer thereby. My friends



thought he was more useful as a watch-dog if he stayed outside than if he la.  
in the house. My cousin's wife, Mary Dixon, was not enthusiastic about the lif  
on their 100-acre farm. ~~Indeed~~ Many farms in Ontario at that time were of  
50 acres but they required careful management to obtain a living from them.  
The township of Osprey had been surveyed comparatively recently, namely in  
1849-50, and its population had come largely from "down below", that is <sup>from</sup> the  
old-settled townships near Lake Ontario.

After breakfast we started in the sleigh for the village, three-quarters  
of a mile east and one and a quarter north. The air was clear and cool,  
the road was good and we went directly to see the chairman of the school  
trustees with whom <sup>cousin</sup> Robert left me. He was Wesley Long, the postmaster of  
the village, but he was a farmer as well. <sup>and indeed a carpenter too</sup> From the Postmaster General's  
Report I learned later that the revenue from the Maxwell post office for  
the year ending June 3, 1884, was \$284.00 and the postmaster's salary was  
\$120.00. Mr. Long was a middle-aged man with a goodly flock of children  
anging from those who could assist in the post office to a child in arms.  
He received me cordially. In the course of our conversation, he told me  
that my application was the last received of twenty-seven and that it  
had at once been picked out by Dr. Kerr and then approved by the other two  
trustees. <sup>B.S.</sup> Dr. <sup>A</sup> Kerr was the only physician in the neighborhood and had a  
wide practice. He had been a trustee for several years and was just retir-  
ing from the board. His successor was Daniel K. Preston, a farmer a quarter  
of a mile west of the corners. The third member was Henry Field, a shoe-  
maker and also a farmer. They all had good-sized families each with sev-  
eral of school age. They were all my staunch friends and firm supporters  
during my stay <sup>at</sup> ~~in~~ Maxwell.

Mr. Long invited me to take New Year's dinner with his family, and in  
the afternoon the other trustees came to his place and we discussed my con-  
tract. At their request I filled out the <sup>regular</sup> printed form, the only exceptional  
feature of <sup>the contract</sup> ~~it~~ being the condition that I should have only four weeks of



holidays instead of the usual six weeks. This was due to a demand which had been made that the younger children should have a longer time to attend school in the summer as they <sup>had</sup> ~~have~~ to stay at home on the stormy winter days. I was agreeable and wrote this condition on the margin. It was duly signed by *the* three trustees and myself and properly witnessed, and the corporate seal of "School Section No.9, Osprey" was attached. The salary was to be \$400.00, payable at least quarterly, and the contract was to remain in force until terminated according to agreement. I may say that on November 10, 1884, the contract was altered so as to cancel the condition respecting reduction of summer holidays and to raise the salary to \$450.00, which was the most the board ever paid and from which I was able to save a substantial sum. I have the document containing the original contract still.

Next, I had to find a boarding-house. My predecessor (W. J. Patterson) was a married man and lived half a mile south of the school in the Presbyterian manse; the church and surrounding cemetery <sup>ed</sup> adjoining the school yard on the north. He took an active part in carrying on the work of the church and was leaving, I understood, to attend Queen's University and become a fully qualified Presbyterian minister. However, it did not turn out so, and he ultimately became professor of mathematics in the Western University at London, Ontario. In general, the houses were not large with some 'spare' rooms; and, further, there was usually a number of healthy children in each. But at last I was accepted at the Methodist parsonage, which was one of the better houses of the community and very conveniently located between the school and the village. This house was built by George S. Bowes who with James A. Sutherland conducted a big business in the 'sixties', at which time Maxwell was relatively of greater importance to the surrounding country than when I was there. Besides being general merchants, Bowes and Sutherland bought grain between 1860 and 1865, i.e., during the American Civil War. Teams from as far west as Durham would bring the grain to market at Maxwell whence it would be carried forward to Collingwood to be shipped by water or <sup>by</sup> rail. It is stated that dur-



ing the winter of 1863-64 these merchants took in 32,000 bushels of grain.

While I lived in Maxwell I learned of a farmer who complained of the low price <sup>the over-reckoning</sup> of wheat and <sup>for his</sup> <sup>he</sup> wished for another war when he would get as much as \$2.50 a bushel. Mr. Sutherland, I believe, built the house occupied by Dr. Kerr, north of the gravel road.

The school was half a mile south of the village, on a gentle rise, and the parsonage half-way between. The minister's name was Calvin Shaw. The church was originally Wesleyan Methodist and was built in Maxwell's palmiest days. There had been also a Primitive Methodist organization, but the union of the different Methodist bodies had just recently been consummated and only one of the church buildings was in regular use--namely that belonging to the former Wesleyan body. The parsonage was alongside it, in large grounds well laid out with shrubs and flower <sup>and</sup> beds and <sup>a</sup> kitchen garden. A third church in the little village belonged to the Anglican body and was located on the gravel road just west from the crossroads. Its members were not numerous but they were rather exclusive and very devoted to their church. It was served by a clergyman from Markdale, fifteen miles away. I seldom attended, but did not care to miss their autumn harvest home, when the church was beautifully decorated and the address by the minister was full of pleasing allegories and references to natural phenomena.

There was no Roman Catholic church, although there were some families of that persuasion. On the other hand there was a Loyal Orange Lodge, which first had its meeting place in a hall on the side-road near Dr. Kerr's house but later <sup>the lodge</sup> <sup>the</sup> bought <sup>a</sup> Primitive Methodist church building and moved it to the north-west corner of the cross-roads.

Mr. Shaw, the Methodist minister, was a thoughtful, earnest man, and on his circuit were three or four other appointments which he reached by horse-and-buggy, preaching usually three times a Sunday. He endeavoured to keep his mind fresh and active by reading several magazines and reviews which undertook to present essays on the leading questions of the day. These he obtained by



arrangement with some of the high officers of the church in Toronto. They would read the public relations first and then send them on to him. He used to draw my attention to some of the articles. Just recently I came across a summary I made of an article on "Spain" in the London Quarterly Review for January, 1884. I entered it in a scribbling book which I have preserved all the years since then. Spain at that time was in the world-news as it is now, and the article outlined the history of the unfortunate country from the beginning of the nineteenth century. I quote the closing sentences of my summary:

Spain has been too long kept out of the "Comity of nations."

She has experienced her lowest level, and now industry is reviving and we feel that she says --

"O give me time, give me but time,

And I will win the guerdon"

No doubt Spain will lift up her head.

In the very next issue of that same Review (April, 1884) was an article on Egypt which was then in international difficulties, especially with England and France, and of it also I entered a summary in my scribbler. I think it would not be hard to <sup>demonstrate</sup> ~~find~~ the cyclical occurrence of national disturbances in Spain and Egypt.

Mrs. Shaw was an excellent woman, well educated, and a capable helper in all the work of the church. There were three sons and three daughters. The two oldest boys were employed in business in Toronto, the eldest girl was studying music and also giving lessons in it at home, the next girl had passed the Entrance Examination, and the remaining boy and girl were of public school age. A superior family! Mrs. Shaw did not wish another member to be added to her household, but she recognized the urgency of my case; also, she knew that the parsonage was the most commodious house in the community, and so she agreed to take me in--at \$3.00 a week, which was not far below what the boys in Toronto had to pay.



I was given a room upstairs at the front of the house. Through it the smoke-pipe from the wood-stove in the hall below passed and then entered into the chimney. For some reason that chimney always sweated when a fire was started in the stove, and the dirty black sooty liquid which ran down defiled everything it touched. On account of this there was seldom a fire in the hall stove. But I was one of the family and was always comfortable in the living room.

The parsonage was a good two-story, square-built structure, with a cottage roof and faced the west. It was set on a terrace about one hundred feet back from the road. In 1884 the sides of the house were clap-boarded, but since then it has been veneered with brick. The church on the next lot, has also been veneered with brick.

Next day was Wednesday, January 2, 1884, the opening day of the school term. The sun shone and the air was refreshing. Well before nine o'clock I was at the school to receive the pupils.

The building was of wood, about thirty feet wide and fifty feet long, the walls sheathed with up-and-down boards with battens. The east end was the front. In it were two doors, one for the boys, the other for the girls, but actually only one was used at the time. Over the doors, as a protection from the weather was a 'lean-to' porch which one entered at the south end. Upon the roof <sup>near</sup> ~~at~~ the front of the building was a belfry, but without a bell, and a chimney was at the rear or west end. Within, there was a big wood-stove near the front, and the stove-pipe, running the length of the building, materially helped to warm the room. There were three windows in the north side and three in the south side. Some years before this the outside of the building had been painted white. It was quite respectable but needed some repairs and re-painting. While I was there, I proposed that a bell be obtained and the trustees were quite agreeable, but it was not easily obtainable and the purchase was held over.



Some years later--just when, I do not know--the windows in the north side were blocked up, and three pairs of windows, of pleasing design, were introduced in the south side, to replace the original single ones there; and a smart-looking portico was built over each of the front doors, replacing the cheap-looking 'lean-to' of my time. The pupils approached the school on a central cement walk, and the boys turn right into their portico, the girls turn left into theirs. A bell was also mounted in the belfrey. After the repairs and improvements had been made the building was given a coat of brown paint with white trimmings. After the motor car had rendered it easy to make trips about the country, it gave me great pleasure, in 1929, to visit old scenes in Osprey Township. Of them all the school-house and grounds interested me most, and I was glad to take several photographs showing great changes since I presided there.

Thirty-five pupils appeared on the first day and were duly enrolled. I arranged them according to the "book" each was reading in--first book, second book, etc.--or according to their "grades", and began to prepare a time table.

I may say that the old red-covered Readers, "Authorized by the Council of Public Instruction for Ontario," and "Entered according to Act of Provincial Legislature in the Year one thousand eight hundred and sixty-seven, by the Reverend Egerton Ryerson, L.L.D., Chief Superintendent of Education for Ontario, in the Office of the Registrar of the Province of Ontario", had just been discontinued and new ones authorized in their place. In the passing of the old and honourable series I felt I was saying good bye to old friends, <sup>but</sup> it was really time for a change.

However the change-over to the new readers was not accomplished with perfect smoothness. The Chief Superintendent of Education had been succeeded by a Minister of Education with a seat in the Cabinet of the Provincial Government, and the contract for the new readers would be made by the Minister of the day. Several publishing firms had incurred great expense in preparing sets of readers in the hope of having them authorized for use in the schools.



Further, a political minister is subject to political influence. The upshot was, three sets of readers were approved. But this was soon discovered to be a mistake, and in order to straighten out the resulting tangle an entirely new series was prepared under the direct supervision of the Minister of Education and the publication of the books was awarded to the firms which had figured in the previous contracts. The mistake which had been made could not be completely corrected, and the publication of school books has been a favourite topic for political charges for many years. I bought a sample of the other sets of readers in order to obtain suggestions to help me in my work of instruction.

The children who enrolled this first day were mostly larger boys and girls. Some of the bigger boys of the section had to help on the farm during the spring and summer and into the fall but were free to attend school during the winter. These I was especially anxious to help. Some of them were taller and probably stronger than I and certainly I should not have cared to match my strength against theirs. Occasionally there was an exhibition of roughness and perhaps some ill-nature, but I met them in a spirit of courtesy and co-operation, yet with firmness, and there was no approach to laying hands on any of them. Fifty years later, in 1936, the biggest boy of them all (Adam Reid), accompanied by his two daughters (one of them married), called to see me at the David Dunlap Observatory, which had been officially opened the year before. He had spent twenty-two years in Winnipeg, then a long period in Kansas City, and then he took up residence in Toronto. Three years before this visit he had gone to Maxwell and picnicked under trees planted in 1885--which will be referred to later.

Thursday, January 3rd, broke clear and cold and the attendance was greater, although I have not a record of the exact number present. I perfected my time-table and began the serious business of teaching. Everything seemed to be satisfactory and progressing according to pattern. But in the afternoon clouds appeared in the sky and by four o'clock snow was



falling and west winds were blowing. This continued all night and in the morning many deep snow-drifts were to be seen. The weather was cold and blustery and moving about outside very unpleasant. However, I had no serious difficulty in walking the short distance to school; but only a few scholars came, and a message from a trustee advised me to close for the day, which I did. This fierce storm continued for three days, and when it was over the snow-banks were higher than the fences. When I would come from the school to the parsonage I would walk over the fence instead of going on farther and through the gate.

I was not accustomed to such heavy weather but found out by experience that high winds were frequent and there was an abundance of snow. Indeed the climate was quite different from that at my old home a few miles north of Lake Ontario.

Some reason for this may be found if one examines the Topographical Maps issued by the Canadian Government on which contour lines are drawn.

My school-house was situated on a little hill at an altitude of 1600 feet above sea level. Very little of the township of Osprey is at a lower altitude while much of it is at 1700 and some at 1750 feet. Now the Georgian Bay, which is less than twenty miles away, has a mean level of 581 feet, which is about 1100 feet lower than the average of the surface of Osprey Township. It is interesting to learn that this township is on a plateau of the Blue Mountains and is the highest block of land in southern Ontario. In its swamps are the sources of the Beaver River which, on the whole, flows north, emptying into the Georgian Bay at Thornbury; of the Rocky Saugeen which flows west into Lake Huron at Southampton; of the Mad River which flows east into the Nottawasaga Bay ~~which is a portion of the great Georgian Bay~~; and ultimately, at Wasaga Beach, enters Nottawasaga Bay which is a portion of the great Georgian Bay; and of a branch of the Grand River which flows south to Port Maitland on Lake Erie. These streams in the township are cold, clear as crystal and swift-flowing.



The land of the township is inclined to be light, with many small boulders which cannot be completely cleared away, even with persistent hard labour. In some places the soil is shallow, with many an outcrop of limestone rock. Also, summer frosts are not uncommon. Consequently farming operations are not so attractive as in some other parts of Ontario. When I was a resident it was not so long since the first settler had come, which was in 1850. Some of the citizens had certainly made a success in improving their property. It was very pleasing to see some excellent houses, often with the original log cabins not far away.

Perhaps there was not so much wealth per inhabitant as in some of the earlier settled townships "down below", but the lack of worldly goods was more than balanced by kindness of heart and generous hospitality.

In the weeks which followed there were many fierce winter storms, but during that first half-year there were no more days on which the school could not be kept open.

However, before the cold weather was over the firewood for the stove was approaching exhaustion, and notices calling for tenders for a further supply of wood were posted in the village. The best offer was for eight cords of hard maple wood at 80 cents a cord. The cord here was defined as a pile 8 feet long 4 feet high and 2 feet wide. Hard, or sugar, maple is the very best of firewood and there <sup>were</sup> still great supplies of it easily obtained. Of course the wood which was delivered in our woodshed was green, and when it was burned in the stove the sap oozed out at the ends of the sticks, making a disagreeable sizzling noise. The fire required continuous attention lest it might go out.

When I was at the Model School there was a jingle in the kindergarten which began --

"Birdie in the greenwood

Warbles bright and fair."

The sizzling in the stove suggested some verses which, with due apologies, I must quote. They were supposed to be sung or spoken by a bachelor shoemaker who had opened a repair-shop in the village. I sent them to the Dundalk



Herald and the editor printed them.

Green Wood

(By a Maxwell Bachelor)

O fire made of green wood  
Will make a preacher swear;  
I think I've never seen wood  
That can with mine compare.

I poke and fix my fire,  
But still it seems no good;  
I'd like to raise it higher  
Than Moses ever stood.

At <sup>my</sup> Morning on awaking,  
I groan "It must be done,"  
And soon I'm fire making,--  
My trouble has begun.

Then when I get it going,  
I crawl to bed again,  
And sleep once more, not knowing  
How long I shall remain,

Till after half an hour  
I find I've slept too long;  
I jump, and try my power  
To start the kettle's song.

Then to my place of business  
When breakfast's o'er I go;  
My head is filled with dizz'ness,  
Knee-deep I plow the snow.



Soon as my walk is ended

The trouble starts again.

Green wood was not intended,

I'm sure, for single men.

The Methodist Church also required a supply of firewood for the next winter, and this was obtained by a "bee" of the members. It was on Saturday and I was pleased to join in the operation. Maple trees were provided free in a near-by "bush". First they were felled, then sawn into suitable lengths and then split but not into too fine sticks. After this, several sleighs conveyed it to the church property where it was piled in the attached shed. By the time the wood was used the next autumn and winter it was thoroughly dry and made an excellent fire. I did not distinguish myself in this heavy labour, and I fear the brethren thought I was not much of a woodsman. Years later, however, I became quite proficient with the buck-saw!

As the months passed the work became more routine, and yet it was always strenuous as the attendance was so large. I had no serious difficulty keeping order, but I was ever on the alert, not to allow any trouble to spring up.

I united with the Methodist Church and was asked to teach a senior class in the Sunday school. I am afraid I was sometimes rather narrow in my explanation of doctrine or of interpretation of certain rules for behaviour. I was still youthful, without much experience, and was considerably influenced by the teaching I had received a few years earlier. I was invited to become a member of the small choir and enjoyed my associations there. I tried to sing by note but lacked the assurance which comes from training and practice. We lacked a thorough musician as a leader, one who would drill us until we could take the notes with ease and precision. But I enjoyed this part of the life and at my request we all drove to Flesherton to have a group photograph taken before I left.



The Sunday school and other groups had picnics usually at Eugenia Falls seven miles away on the Beaver River. Here was a picturesque and beautiful valley with the water falling some seventy feet. Since that time the Hydro-Electric Power Commission of Ontario, by utilizing the drop in level of the river at the falls and in the rapids, thus obtaining a "head" of 475 feet, has been able to generate 5000 horse-power. By the end of 1915 the plant was in operation. Through the construction of a dam Eugenia Lake has been formed, some two miles long. The picturesque Falls are gone and the view of the Lake hardly compensates for the loss. However on the credit side of the changes made is the great electric power which is a blessing to the Province.

Another place for picnics was half a mile south of the school-house in the "Beaver meadow"--a beautiful circular area of level grassy land bordered by thick small trees, mostly thorn bushes, I believe. Just how this "little prairie" was produced I do not know. Very near to it was the source of a branch of the Beaver River.

For help in my work of teaching I took two magazines: The Educational Weekly, which had recently been started by John E. Bryant, a former high school teacher at Galt who (I understood) left teaching on the approach of deafness and went to Toronto to establish a printing business; and The School Supplement, a monthly edited by Seymour Eaton and published by Eaton, Gibson and Co. It was attractively printed and contained many novel suggestions. But Ontario did not seem able to support properly two such publications and both ceased before I gave up teaching the country school. Eaton was full of ideas and was continually making changes in his paper and this led to a feeling of impermanence. I believe he originated the Tabard Library and went to Philadelphia to build it up.

There were concerts in some of the schools during the winter and neighboring teachers were invited to contribute to the programme. I remember very well one in the school at Carleton Place <sup>five miles south of Maxwell in which I undertook to</sup> sing "Massa's in the cold, cold ground". At that time I knew nothing about Stephen Foster, but thought the song was recent instead of having been written in 1852. The words and music appeared



*in* Truth, a weekly magazine printed in Toronto. From a half-inch board I cut out the shape of a guitar and stained it brown. Then I stretched on it six strings supported at the ends so that they were about half an inch above the board. These I twanged as in a real guitar while a friend played the real accompaniment on an organ. I wore a home-made black mask and the song really pleased the audience. Readings comic and serious and addresses filled up the two-hour programme and we drove home in the sleigh. Often excellent talent was exhibited.

Good Friday in 1884 was on April 11, and I greatly desired to go home for the Easter holidays. My trustees graciously permitted me to take Thursday the 10th for a holiday in order that I should not spend all my time going and coming. Bright and early on Thursday morning a friend called at the parsonage with his sleigh and we started for Dundalk, ten miles directly south. As we were approaching this village we heard the train coming and feared we should be left behind, but the horses made an extra spurt and we arrived at the station just as the train pulled in. I had some hours in Toronto and was able to attend to some business and see some friends before leaving on the evening train for my home village. This short Easter visit was very pleasant after my first three months "on my own" in a responsible position. The days soon passed and on Monday morning I took the train to Toronto and left on the evening train for Flesherton Station, whence by bus I went on to Flesherton Village and there waited several hours for the Maxwell mail man. Indeed I started to walk the nine miles to Maxwell but about a mile out I met Taylor, the "mail-courier" who, never swift, had been delayed by heavy roads. I jumped in and went back to Flesherton, and after another hour's waiting we started on the nine-mile 'treck' eastward. The road was full of pitch-holes and the old "cutter" continually went down into a hole then up again, making it impossible to sleep or rest. I reached the parsonage at 3.30 a. m., quietly let myself in and went to bed,--and next morning was at my place in the school-room, pleased with my holiday and happy to get back to the boys and girls.



At last the end of the long winter seemed at hand. The sun, mounting steadily higher each day, had melted the snow until the remnants of the deep banks were seen only in sheltered places. The icy sleigh-tracks were breaking up, revealing the brown soil beneath, and soon the roads became muddy and almost impassable.

The budding of the maples and elms in the distance, and of the shrubs around the parsonage grounds; also, the peeping-up of the violets at the gate, on each side of the walk; as well as the cawing of the crows overhead; proclaimed the advent of spring. In all my years the coming of that season in 1884 was the most welcome. No spring has had a more inspiring atmosphere for me!

The 24th of May, the birthday of Queen Victoria, had been a joyful holiday long before my earliest recollection. We used to repeat:

The twenty-fourth of May

The Queen's birthday,

If you don't give us a holiday

We'll all run away.

But in 1884 it fell on Saturday which was a holiday for me anyway.

My friends told me it was the opening day of the trout-fishing season, and suggested that I try my luck in the Beaver River, half a mile north of the village. I bought a bamboo rod, also line, hooks and other tackle at the store. I have never risen above the plain bamboo rod!

Well, on the morning of the 24th I put on what old clothes I could find, collected my fishing gear, dug sufficient angle-worms in the kitchen garden, and was just leaving when Mrs. Shaw called me in a smothered tone. I went over to her. In a low voice she said, "some folks have come to get married, and they want you to 'stand up' for them." "They cannot want me," I replied, but she insisted they did and asked me to help them out. Their "groomsman" could not come and they wished me to act for him. I had to agree. So I rushed upstairs and changed my clothes and in a few minutes was down in the sitting room which was the scene of action.



The young man and young woman had come from a place three or four concessions to the north where Mr. Shaw had a preaching appointment. Their names were John Alexander Macdonald Miller and Harriet Elizabeth Watson, both about six feet tall and slim, but the Licence gave their ages as 21 and 19. He was dressed in a simple tweed suit and long boots with the trousers stuffed in them. I do not remember her dress, but it was not decorated with orange blossoms and diamonds. Neither showed many marks of intelligence or any personal attractions. Harriet's older sister Sally seemed to be the manager of the party and was continually moving about the room.

The minister said he was ready. The innocent-looking pair rose, Sally drew near to assist the bride and I did the same to support the bridegroom.

Then the minister read: "Dearly beloved, we are gathered here, in the sight of God, and in the presence of these witnesses, to join together this man and this woman, etc.," and he called upon the rest of us to ".... now speak or else, hereafter, forever hold his peace." We held our peace and the ceremony. <sup>proceeded</sup> To the question whether he would "love her, comfort her, honour her, keep only unto her so long as ye both shall live," John, as it was whispered to him, slowly answered, "Yes, I will." The minister then asked him to repeat some sentences spoken slowly in short phrases, but to me it was a mumble.\* He repeated "for better, for worse" plainly, but when it came to "thereto I plight my faith" all I could hear was "there ply my fay". Harriet did very little better, but after a prayer and a blessing they were declared securely joined together.

After some hand-shaking the minister proceeded to make out the marriage certificate, and the new husband, after a word from Sally, pulled out his red pocket-book. Then with deliberation he took out a bank-bill and upset the change out on the table. Sally gathered up all and presented it to the minister--a dollar bill, a quarter, a ten-cent and a five-cent piece!

Donning their hats the odd trio left by way of the kitchen door and set out on their five-mile walk home.



I looked at my watch and found it was just a quarter to ten, and before the hour was completed I was on my way northward to the river. I really had better luck <sup>on</sup> that first experience angling for trout than on any later occasion. As I wandered along the rough banks of the crystal stream I philosophized on the event of the morning, and although I may have been too young to come to a valid conclusion I was inclined to think that some young Canadians had yet to learn the truth of two axioms in the geometry of life, which I think are given by "Peregrine Pickle":--

I. Youth and discretion, with respect to each other, are as two parallel lines which, though infinitely produced, remain equidistant and will never coincide.

II. The angle of remorse is equal to the angle of precipitation.

A few days later, on May 29 and 30, the annual meeting of the South Grey Teachers' Association was held in the town hall at Flesherton. All teachers were asked to attend, and as there was no regular transportation between Maxwell and Flesherton I walked the nine miles and enjoyed the sunny day. I was glad to meet my fellow teachers. The special feature of the meeting was the presence of Mr. John Tait, Mathematical Master of Collingwood Collegiate Institute. He gave 'set' addresses on "Grammatical Difficulties" and "Written Examinations," of both of which I took full notes, and he answered all sorts of questions put to him. In discussing the arrangement of windows most effective in lighting a room he said windows in the shape of a dome would be best. I supposed he took the vault of the sky as the pattern.

Next year the meeting was held in the same place on May 28 and 29, and J. J. Tilley, the Director of Teachers' Institutes, was the chief speaker. From the printed programme, which I preserved, I see that he spoke on "Geography," "Fractions" (with a class), "Relation of the teacher to his work," and at the public evening meeting his subject was, "Relations of education to the state." The secretary had asked me if I would give a paper and I said I could speak on "Phonography" if he wished it. I was assigned



9.40 to 10.00 a.m. on the second day. The sessions were interesting and valuable to me.

I was brought up to have decided views on the temperance question. In the first place, my father was a total abstainer and was an ever-present example for his children to follow--which they did without hesitation. Then every year there was a temperance Sunday in the church and temperance lessons in the Sunday school. I remember also, when I was a little boy, hearing Mrs. Letitice<sup>a</sup> Youmans (of Picton, I believe) speak to the boys and girls on temperance and appeal to them never to begin to take strong drink. She was an able advocate of total abstinence. When I was at school in St. Catharines I attended an adult class taught<sup>I believe,</sup> by her brother, Dr. M. Youmans, who was equally strong in his views that one should 'let it alone'. He used to entertain the Collegiate Institute<sup>students</sup> in his home and was highly respected by us all.

Two generations earlier there had been much drinking as whiskey and beer were so easily obtainable. On reading the history of the townships of Markham and Vaughan one learns that on every mile or less of the principal streams there would be a saw mill, a grist mill and likely a distillery or a brewery. I suppose the same thing happened in most other townships. Certainly in my youth the country hotels had the reputation of leading both young and old into moral delinquency. At Maxwell there was a licensed hotel which had an injurious influence on the young men of the neighborhood. In an attempt to provide a place of amusement and improvement a Division of the Sons of Temperance had been instituted shortly before I went there. In Unionville there was a Lodge of the Independent Order of Good Templars to which some of the older members of my family belonged. It was quite active and had a good influence on the citizens of the community.

The teacher is always expected to be a strong supporter of the temperance cause and the Rev. Mr. Shaw was the general leader in Division No. 312. On his invitation I became a member. The simple ritual of the order impressed the members, <sup>and</sup> but the programme of a meeting usually was composed of



readings, songs and addresses. I could give a public reading fairly well, but as a source of amusement for the members, I undertook to produce a vision newspaper. It consisted of a double-sheet of foolscap, four pages in all, and I called it

### THE EXTERMINATOR

#### of Intemperance

It contained verses, editorials, local personals, a half-page of advertisements, and news of temperance campaigns. It ran to six numbers. Now, sixty-three years later, as I write this I have the six issues before me. They are dated June 3, 17, July 8, Sept. 9, Oct. 7, 21, 1884.

At that time there was great activity in bringing on local election voting under the Canada Temperance Act. An attempt was being made to have contests in the group of counties, Grey, Bruce, Huron and Perth.

My verses were mostly of the hortatory type, dealing with the fight for temperance legislation. I hope I shall be pardoned for quoting the first column of the first page of Issue No. 1, dated June 3, 1884: (asking special pardon for mixed metaphors):

#### To the Sons of Temperance

Raise high the Temperance banner,  
Grasp firm the sword and Shield!  
Ring forth the swelling trumpet  
To call men to the field!

Why should we not go forward  
And conquer all before,  
Of intemperance found lurking  
From East to Western Shore?

We're stout and strong to labour  
To banish from our land--  
From this our own Ontario--  
The curse, 'twill not withstand.

Roll on, O "Sons of Temperance"!   
Though storms may overtake,  
And billows dash upon thee  
Thy pillars never shake.

For from the firm foundation  
Of virtue do they rise--  
Their bases on the earth, here,  
Their summits on the Skies.



Yea, rise in all your armour,  
 And stay the dreadful dearth!  
 We'll help to swell the army  
 To sweep drink from the earth.

In the other column of the first page is an account of "Our Order", which states that it was instituted in Ontario in 1849 and that in 1884 there were 200 Divisions with 6449 members.

I must be excused also for quoting from page 4. One of the village citizens was John Miller. His business I cannot recall, but he possessed a light wagon, a mule and a jackass, and the latter seemed to bray almost hourly. So there appeared the following contribution.

Did Ye not hear it?

It is fine I do say, in a new-fashioned rig,  
 With spanking smart horses, all looking so big,  
 To drive all about, all across, all around,  
 Over smooth, over rough, all safe and all sound;  
 But most dreadful it is, while through Maxwell I pass,  
 To hear in his sorrow John Miller's jackass.

Though the day be so grand, though the day be so find,<sup>e</sup>  
 Though the roads be so smooth, and I ne'er touch a line  
 To rouse up my horses, they trot on so well,  
 As if they were bound ~~ed~~ some grand tidings to tell;  
 Though all look as bright as the new-spring-up grass,  
 I always feel sick when I hear that jackass.

The voting on the Canada Temperance Act in Huron was on October 30, and the majority favoured the Act. This led to the following effusion, which was printed in the Dundalk Herald:

Victory

Nail the banner to the mast,  
 Nevermore to be torn down!  
 Shout! for Huron, safe at last,  
 Proudly wears a victor's crown.

Doomed forever that liquid fire  
 Sadly known as cursed rum,  
 And the vendors, in their ire,  
 Stand demoralized and dumb.

Shout hurrah! This devastation  
 Now to curb is in our power!  
 Shout hurrah through all the nation,  
 Drink is sentenced from this hour.



Hard the fight;<sup>65</sup> but why should error  
Longer trample down the right?  
Why once happy homes, in terror,  
Even hate a father's sight?

Thanks to God, who helped the victors,  
Gave them strength to fight the wrong;  
Thanks to God, ye wise electors,  
Thankful praise to him prolong.

(Don't forget that the writer was still in his 'teens)

The Act was ~~defeated~~<sup>repealed</sup> in Huron in 1888 but was carried again eight years later and is still (1947) in force. The efforts of some persons in high authority to override it have not been successful or creditable or in accordance with the principles of true democracy.

### GEOGRAPHY AND HISTORY

In my teaching I utilized various expedients to keep up the interest in my big classes. At that time there was trouble in Egypt. The rulers of that historic land had lavishly squandered their money, and in 1882 England and France intervened on behalf of foreign bondholders. Some time later France withdrew and England carried on alone. In 1884 there was a rebellion in the Soudan headed by the Mahdi, the religious leader. General Gordon, a remarkable man, was sent to cope with the revolt and bring about peace; but he was besieged in Khartoum and the British Government had to send an expedition to relieve him. It was placed in charge of Sir Garnet Wolseley. Now in 1870 <sup>Wolseley</sup> he commanded the Red River Expedition to put down a rising under Louis Riel, and as the expedition of 1884 was to travel some 2000 miles up the Nile he thought a Canadian contingent of 400 men, chosen for their experience in paddling canoes, and in rowing or poling boats or pulling them up the rapids by ropes, would be of special value to the expedition. So they were gathered together and on September 19 they sailed from Sydney, Cape Breton. Each day I wrote on the blackboard information of the expedition which appeared in the newspapers, but before it reached its destination Khartoum had fallen and Gordon was killed. This tragedy occurred on January 26, 1885. The Canadian people were profoundly interested and felt this to be a tragic loss.



ARITHMETIC

In teaching arithmetic I gave it a practical turn by taking up the question of finding the number of yards one would have to buy to cover the floor of a room of a given shape and size with carpet of a given width; or the number of bundles of shingles to cover a particular roof; or the square feet in walls to be painted. I would send the big boys out to measure the school-house or the church shed, and when they came back they would make the required computations.

SPELLING MATCHES

We had spelling matches and other contests on Friday afternoons. I would name the two captains who would then choose their supporters and arrange them along the opposite walls. One of the contestants <sup>in these matches</sup> three score years afterwards, <sup>to me</sup> recalled the interesting times they had.

COMING LATE

The problem of coming late gave me considerable thought. The school was opened with reading of the Bible and an appropriate prayer, and during these exercises no one was allowed to enter the room,--he must stay outside in the covered porch; but on bitter cold mornings I always asked a boy near the door to call the tardy ones to come inside. In my first experiment to stop late-coming I printed on the blackboard the word LATE, and each pupil who came late wrote his name under it, with the number of minutes he was late. This was not very effective, the young offenders soon forgot the little disgrace. Then I made each one stay in at recess, to make up the time they had lost, but I soon decided <sup>that</sup> ~~this~~ was not wise, they should be out in the fresh air. This principle of making up lost time, however, was a good one. So I decided that the delinquents should stay in after dismissal at four o'clock the number of minutes they were late. That was a fair punishment. But I did not stop at that. When I had finished what little tasks I had to do, I would go down to each one who was waiting there. "Well, Charlie," I would ask in a friendly way, "how is it you were late to-day?" He had to watch the baby, or do some other job. He would promise to be on time and



I would not hold him any longer. Off he would scamper to catch up to the others. A few kind words produced a favourable response and the annoyance of "coming late" nearly disappeared.

### THE "ROSS BIBLE"

I have spoken of the opening religious exercises. Late in 1884 or early in 1885 a copy of the "Scripture Readings for Public and High Schools," commonly called the "Ross Bible" came by post to my trustees and was promptly sent up to me. My trustees were all politically opposed to the government in power but they did not allow politics to enter into school matters. I used the book during the remainder of my stay at Maxwell and found it an excellent compilation. My pupils represented several religious denominations, including the Roman Catholic Church, but no objection ever came from them. I was very sorry when the book of Readings was made a political foot-ball. On December 28, 1886, there was a General Election for the Ontario Legislature, and I attended a meeting called in support of the Liberal Candidate, whose name was William Brown. The official Conservative Candidate was Joseph Rorke. The meeting was in the Orange Hall. A generous allowance of time was offered to anyone to speak for the Conservative side, and as Mr. Rorke was no orator he secured <sup>as his advocate</sup> Dr. T. S. Sproule, who was elected M. P. for this riding in 1878 and was made Speaker of the House of Commons in 1911, serving until 1915, when he was appointed to the senate. I had met Dr. Sproule on the occasion of his father's death at the old home just east of Maxwell. The doctor lived in Markdale and he had a fine reputation as a physician and a good citizen. Well, he ridiculed the pretensions of the Liberal candidate and then undertook to make political capital out of the "Ross Bible", making unfair references to it. I thought it unworthy of him.



At this same meeting there was an amusing incident. The Liberal candidate in endeavouring to bring credit to the Government for improvement in the liquor selling business throughout the Province contrasted conditions as he had seen them on that day at the local hotel with what he had seen <sup>there</sup> some years earlier. He said he had gone minutely into every part of the building and had also carefully inspected the entire premises and the grounds, and he stated that he had observed very little drinking--indeed, he saw only one person under the influence of liquor. A man in the audience, well known for his occasional indulgence, thinking the speaker was becoming too personal, began to stir uncomfortably in his seat as if he was about to protest, when an old crony of his called out, "It wasn't you, William." The liberal candidate was not elected although the Mowat Government was sustained.

#### GENERAL STORE

The general store at Maxwell had had a large trade for many years. It was most important before the Toronto, Grey and Bruce Railway was built. I have referred to Bowes and Sutherland conducting the store during the 'sixties. For most of the time I lived in Maxwell it was owned by Stinson who had a store at Singhampton, eight miles east. The manager of the store was 'Andy' Sharpe, a few years older than I and a valued friend. He had big dealings with the farmers who brought in their butter and eggs, and on some busy Saturdays I helped him in the store. A news item in The Exterminator for October 7, 1884, states that since May the store had received 4700 pounds of butter. It usually came in large rolls and there was no attempt to adjust the price to the quality <sup>city</sup>, ten cents a pound was allowed for it all. It was taken



to the cellar, mixed together and worked into a homogeneous mass. I do not remember the price paid for eggs--certainly lower than ten cents a dozen. They were collected by a big truck which came on specified days each week.

### ARBOR DAY

The familiar Arbor Day was instituted in 1885. The regular day chosen for its observance was the first Friday in May but actually it was observed on May 8 in 1885. In the educational journals and in the newspapers there were articles praising the Government for its wise action in providing for such a Day and giving advice and suggestions on the best way to make it a success. The Department of Education circularized the teachers and asked that a report on what had been accomplished be sent by each teacher to the local P. S. Inspector.

My trustees gave me splendid support in this matter. Two of them accompanied me and a large number of pupils to a sugar-maple 'bush' not far away. We carried spades and a saw, and we returned to the school grounds with trees about one to one-and-a half inches in diameter and about six feet high after the top had been sawed off, and we planted them around the yard. There were 36 in all and the Inspector informed me that my report was the best he received. Many of those trees are still living and some of them are from one foot to two feet in diameter. It gives me a joyful thrill to see them and to walk around and under them.

### ART SCHOOL

Early in 1885 the Department of Education announced that the Ontario School of Art would offer a special summer session for teachers. It would last four weeks and tuition would be free. I decided to attend and take the elementary course, which included: (1) Freehand, (2) Linear Perspective, (3) Practical geometry, (4) Drawing from models, (5) Drawing from memory.

During the spring months A. J. Reading contributed to the Educational Weekly a series of articles on Perspective, which I worked over with care. Following his instructions, I made a simple apparatus to illustrate the meaning of



picture plane, vanishing point and other terms, and thus learning the principles of the subject.

The session was held in the Model School attached to the Toronto Normal School, and I am sure a hundred teachers were in attendance. It was a great success. A. J. Reading taught Freehand drawing and F. W. Merchant, then of Owen Sound, had charge of the Perspective. Then it was that I first met him; we were closely associated in after years.

The Department arranged for a visit to Niagara Falls, which gave us an opportunity to become better acquainted with one another. A badge consisting of a blue ribbon on which was printed the familiar scroll of "Education Department, Ontario" and under it "Ontario School of Art", was worn by each of us and helped to keep the excursionist together. I have mine still and it recalls a very pleasant occasion. I passed in all the subjects and received the Grade B Certificate.

#### BOOKS AND READING

During the three years I spend in Maxwell, I did considerable reading. Much of it related to my work but two books of English Literature stand out in my memory. In July 1885 the minister Mr. Shaw, as required with the itinerant system of the Methodist Church, was moved to Huntsville and I had to look for a new place to live. Mr. & Mrs. William <sup>G</sup>uy received me into their home. They were early settlers, having come from the county of Peel, although Mr. Guy was born in Hull, England; and was old enough to acquire the Yorkshire 'brogue' before he migrated to Canada. I soon became able to follow his broadest dialect, and thought<sup>t</sup> his guttural tones and syncopated sentences were much like the 'braid' Scotch. He loved to recall incidents in his life, and often repeated his stories.

At my new home I found the novel Adam Bede by George Eliot. It was a good edition, published by Harpers, with well-drawn illustrations. How it came there I do not know. Mr Guy was not a wide reader. He faithfully per<sup>s</sup>ued The A.B.C. of Bee-Keeping by A. I. Root of Medina, Ohio, and also



the monthly magazine on bee-culture published by Root, selections from which he would read to me with his Yorkshire accent.

I read the novel and was powerfully impressed by it. "Adam Bede" was a type of fiction new to me. George Eliot's penetrating analysis of character and of human motives was fascinating, while her descriptions of incidents and scenes were perfect. I was horrified at the terrible sentence pronounced upon the butterfly <sup>character,</sup> Hetty Sorrel, while her titled betrayer went free.

But there was another aspect of George Eliot. One of the chief actors in "Adam Bede" is Dinah Morris, the woman evangelist. In the second chapter of the book George Eliot gives the very words of Dinah's fervent prayer and of the sermon she preached to the country folk gathered about her.

Now I don't want to hear a man preach or urge support of any cause unless he himself believes in it and practices what he advocates. But I had read that George Eliot was not a believer in the Christian religion, perhaps was 'agnostic', which word had a somewhat fearful meaning then. Further, this very book strongly expressed the view of the inviolability of marriage,--which was not consistent with her own manner of life. Since then I have read several biographies and a number of discriminating essays dealing with her life and works, and I suppose one must be charitable and human in one's judgment. But I cannot dissociate written words from the personal character of the writer. Sweet waters do not flow from putrid pools!

Another book which I came across was Holmes's "Autocrat of the Breakfast Table". The volume was bound in paper and I cannot remember just how I got it, but I thought it was just perfect. It was extremely clever, graceful and abounding in good nature. I wished I could write like that. No young man can read it without feeling an increased pleasure in living and in association with one's fellows.

Of course I read some other books. I remember Creasy's "Fifteen Decisive Battles of the World", which I think I loaned to a college mate and never got back; I picked up" another copy many years later. Also several volumes on



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scientific subjects--evolution, the age of the earth, ~~the~~<sup>etc.</sup>--questions then shaking the world of thought. Another early book was Roget's "Thesaurus", which I thought would help me in my writing. Gradually there grew up the habit of buying books, especially books of information, such as dictionaries and cyclopedias, and often I would 'lay in' a book which I would not use for several years. If I have spent much time or given serious thought on a book I always like to possess it,--it is a part of myself. In recent times, it seems to me, big public libraries have led people away from buying books. Certainly students should own the text-books in their courses of study.

During 1886 I tried hard to study the text-books I should use in the course I intended to take at the University, and I found Salmon's "Conic Sections" tested my strength. I still have Westcott and Hort's text of the "New Testament in the Original Greek", which is inscribed "Maxwell 5/13/1886". I had no difficulty in reading it, but when I tackled Demosthenes' "Olynthiaes"<sup>c</sup> which was on the University curriculum, it gave me a struggle. I was surprised that <sup>of</sup> two selections from standard prose writers in a language one should be comparatively easy to read and the other very difficult.

#### TUTORING AFTER SCHOOL

At the time I was in Maxwell the nearest high school was at Collingwood, twenty-two miles away. There were in the village two scholars, a boy and a girl, who had passed the Entrance Examinations, the latter under my tuition, the former the year before I arrived. They could not go to Collingwood and so I offered to teach them after four o'clock the subjects of the first form of the high school. We started in Latin, Algebra, Geometry and English Literature. They were excellent students and made <sup>rapid</sup> excellent progress, but I did not have them long enough to prepare them fully for the Third Class Teacher's examinations. The boy Richard Preston was exceptionally clever in mathematics. He could solve deductions in Geometry quite as easily as I, and he mastered the other subjects with <sup>without difficulty</sup> ease. If he could have attended the



University he would have swept through with first class honours. For boys and girls of such outstanding ability Government scholarships should be provided sufficient to carry <sup>them</sup> ~~him~~ forward to demonstrate <sup>their</sup> ~~his~~ ability and worthiness. But the means were not available and <sup>the boy</sup> ~~he~~ had to drop out. At first he drove the mail <sup>duck-boat</sup> ~~carriage~~ every day sixteen miles east to Duntroon and back. He actually carried his algebra with him, to study it in his leisure minutes. Then he became a station agent and in a few years was promoted to be auditor on the railway. The girl, Lilly Long, became assistant postmaster to her father, then married and lived a few miles away, and in 1947 was a widow back in the village. She recalled many of our experiences over sixty years earlier.

*The minister Calvin Shaw was moved in July 1885 to Huntville which at that time was growing in importance through railway construction in Muskoka. His successor was*

GOD BE WITH YOU TILL WE MEET AGAIN

As I have stated above, ~~Stephen A. Arkels; became pastor of the Methodist Church in July 1885, but he~~ <sup>who, however,</sup> stayed only one year, and then was transferred to Little Current, on Manitoulin Island. I remember well his farewell sermon. He had a kindly disposition and was well liked as was also his accomplished wife with their young daughter who was given the middle name Augusta, after my own. They were very sorry to leave when the time came to part. <sup>Shortly</sup> A short time before this, from an advertisement, I had purchased a recently published book of Sacred Songs. In it was a new song entitled "God be with you till we meet again!" by J. E. Rankin. I took the book with me to choir practice the week before the farewell Sunday, the organist played the piece and we soon learned it. Then on Sunday, at the close of the service, the little choir sang the four verses. The effect was pathetic--almost magic. The words were so simple and direct and the tune was so appealing that everyone was affected and the minister could hardly utter a word. That song is still very familiar and will surely continue to convey its appropriate message to one who is going away.



SCHOOL STATISTICS

A few statistics regarding my school may be found interesting. I had to keep accurately the school Register and at the end of each half-year had to "make it up" and send it to the Public School Inspector. He would send a new volume for the next half-year. I used to write down some of the information given in the Register and have preserved my notes.

Daily Attendance, &c., Jan.-June 1884

|                                |      |
|--------------------------------|------|
| Highest on any day.....        | 61   |
| Lowest on any day.....         | 33   |
| Highest any week.....          | 55.6 |
| Average for half-year.....     | 46.6 |
| Cases corporal punishment..... | 5    |
| Suspensions.....               | 0    |

I have no record for July-December 1884; but give the attendance for each month of 1886 and also for the whole year.

Daily Attendance in 1886

|           | <u>Highest</u> | <u>Lowest</u> | <u>Average</u> |
|-----------|----------------|---------------|----------------|
| January   | 61             | 41            | 51.0           |
| February  | 59             | 42            | 52.9           |
| March     | 65             | 48            | 53.6           |
| April     | 50             | 37            | 45.6           |
| May       | 56             | 47            | 51.5           |
| June      | 65             | 51            | 58.4           |
| July      | 58             | 58            | 58.0           |
| August    | 54             | 32            | 47.4           |
| September | 57             | 42            | 50.4           |
| October   | 58             | 40            | 47.9           |
| November  | 62             | 37            | 55.3           |
| December  | 71             | 47            | 62.8           |
| YEAR      | 71             | 32            | 52.9           |

I had the pleasure of looking in on the old school on September 26, 1947. There were 17 boys and girls present out of 23 on the roll; and the teacher, Mrs. Meredith, was in her third year.

To keep my large educational machine running smoothly and producing results was quite a task, but hardly a burden, and I look back on my three years in Osprey Township with satisfaction.



NEWSPAPER CORRESPONDENT

During all the time I lived in Maxwell I acted as a correspondent of the Dundalk Herald. I signed my contributions "Mary", who was supposed to be a married woman with a husband named "John". I am sorry I did not preserve some of my weekly news-letters as I spent considerable time on some of them and they would recall with vividness those old times. When describing a visit to the Osprey Fall Fair held one year at Feversham I put my sentences into metrical prose. This was suggested to me by a 'lesson' in the old Fourth Reader entitled "The Stage Coach" which was taken from "<sup>Chuzzlewit</sup> Martin Chuzzlewit" by Dickens. One week, when Mary was too busy, or indisposed, John wrote for her. Now John's education had been neglected and his spelling was very faulty -- "The dokters dotter was sick but wuz gettin better", and "Tomas Jonsuns old sow had fittine litl pigs last saterdy," etc. The editor headed the contribution, "From Mary's Husband" and signed it "John". At any rate it added to the amusement of the neighbourhood.

In the autumn of 1886 the editor proposed to issue a Christmas number (quite an undertaking for a country printing office) and invited his correspondents to send in original contributions. I wrote a story which filled almost three columns and was entitled "Love or Money, Which?" It was based on incidents which had occurred at my old home-town. I have a clipping of it in a scrap book still. It was rather "wooden" and lacked the easy flow of the born story writer. I did not venture on such a composition again.

DRUNKEN SHOEMAKERS

Another interesting recollection is of two 'travelling' shoemakers who occasionally came to Maxwell. One cold evening probably in December, along with others, I was in Robert Heron's general store when a short, stubby man of middle age slipped in. He had no overcoat nor mits and was rubbing his hands for warmth. All but myself seemed to know him and urged <sup>him</sup> to go to the stove and get warm. When he had got thawed out, the proprietor asked him where he had been since he last was in the village. This unloosed his tongue and



he began to describe in minute detail his wanderings and experiences as he tramped from place to place. It really was interesting to listen to his fluent talk and quick repartee. His name was Davy McNey and he had, in part, learned the shoemaker's trade with Henry Field, one of my school trustees. But Davy had a weakness for drink and as soon as he had earned a few dollars he would go off for a spree and spend it all. Then he would try to cajole the hotel keeper into giving him something more, including perhaps something to eat. He did not seem to have any shame for his reprehensible behaviour. Indeed he was an old reprobate and yet it was interesting to hear him describe his smart answers to questions and criticisms "thrown at" him.

Davy went into the bar-room of a hotel, I forget where, and made some smart remark to the proprietor who countered by asking where he came from. He replied, "Maxwell in Grey County." Then said Davy, "And where do you come from?" He somewhat proudly said, "From Boston". Now Davy was observant enough to recognize he was an Englishman, not an American, and he suspected from the north of England. Further, he knew there was a Boston in Lincolnshire and in it a church with a "sawed-off" steeple.

"Do you know Boston Stump?"

The hotel man was astonished. "What will you have?" said he.

Davy was equal to any emergency and the people liked his cheery smile and sharp remarks. They would give him a meal or a bed in the barn whenever he came around.

The other 'traveller' was a Frenchman named Frank Caron. He asked for a job at the other shoe-shop which had been opened in the village by a bachelor who was the "hero" of my verse on "Green Wood" (though I don't think he ever suspected it), and who was advertised in The Exterminator as follows:-

In the very best style,  
In a very short while,  
And a way you'll never regret it,  
I make up my boots,  
In a way that just suits,-  
Come along, and don't you forget it.

D. A. Holman,  
Sign of The Big Boot.



I had interesting conversations with Frank and he had some funny stories to tell, which seemed extra amusing in his foreign pronunciation; but after a week I went into the shop and he was missing. However I looked around the place, and caught a glimpse of him lying on the floor under the counter--drunk! Soon after this he started on the road again, and I have no doubt he was able to make his way, but he was not quick and garrulous and enteraining like Davy. I had never had a close-up view of professional tramps before and this experience confirmed me in my temperance principles.

### SCHOOL EXAMINATION

As the time to close my career as a country school teacher approached I began to gather my belongings. I was surprised at the quantity of books, papers and other things which I had accumulated and it was a distasteful job to pack them into my trunk and black valise. Indeed there was much left over and I had to obtain an empty packing-case from the store-keeper--the successor to Andy Sharp. It was filled to overflowing too.

The last day of school was Thursday, December 23, I had announced that there would be a public examination and invited the parents of the pupils, and others interested in the school, to be present. About forty came and I had difficulty in finding seats for them. There were, of course, the trustees, Wesley Long, Henry Field and Daniel K. Preston. Also W. F. Ferrier, the methodist minister, and W. E. d'Argent, the Presbyterian minister. The latter gave me his copy of Liddell and Scott's Greek Lexicon and G. L. Craik's English Literature and Language, both of which I had been using in my studies. In addition, there was John A. Scott, a fellow-teacher from the hamlet of McIntyre, six miles east of Maxwell. Shortly afterwards he left to take a course in Medicine, and then he settled in Maxwell and became a trusted general practitioner. Among the remaining visitors were many close friends whom I had learned to value in the <sup>preceding</sup> ~~past~~ three years.

After the pupils had exhibited their proficiency for about an hour and a half Mr. Long intervened and said there would be a change in the programme. He said the scholars in the Sunday school had joined those in the day school to



make a party<sup>ing</sup> gift to the teacher. He called three of the pupils to the front and the following address was read:-

C.A.Chant, Esq.,

Dear Teacher,--We feel sincere regret that the connection which has existed so long between us is about to terminate, and therefore desire to convey to you the high esteem which we entertain towards you. You have on all occasions acted the part of the kind, gentlemanly teacher in your intercourse with us, looking to our future welfare and interest at all times. And if we have not profited in every instance by your instruction the fault lies with ourselves, as you have discharged the arduous duties of your office in an able and impartial manner.

May the Great Architect of the universe direct and govern your footsteps and cause you to become a shining light in the path of life which you intend to tread.

We trust you will accept this writing desk as a slight memento of our love and affection toward you, so that when years have rolled away, in casting your eye upon it your memory may for a moment revert with affection to the donors. May you enjoy a long and happy life, illuminated by the bright rays of the Sun of Righteousness; and should it be the will of an all-wise Providence that we should see your face no more in this world, may we meet in that better land where all is joy and peace.

Signed on behalf of the pupils of S.S. No. 9, Osprey  
Calista Preston,  
Amy Kerr,  
Etta Spoffard.

The address was read by the first one who signed it, and the desk, a handsome one of French manufacture, with artistic inlay-work, was presented by the second one. I have it still.

I had difficulty in making an appropriate reply. I was parting from the pupils for whom I had a real affection, and <sup>from</sup> the numerous other friends which I had made in <sup>my</sup> the first adventure in responsible life. However, I managed to say something. Then very kind remarks were made by Messrs. Long, Field and Preston; the ministers d'Argent and Ferrier; and by others.

Mr. and Mrs. Guy, with whom I had lived for a year and a half, gave a party for me on Friday night, Christmas Eve. To this many of my friends came, and gave me their hearty good wishes for the coming years. Rather surprising at such a gathering, after all our games and fun during the evening, Mr. Guy asked the minister who was present to offer a prayer.



I spent Christmas Day and Sunday in finally completing my packing and in making last calls; and then on Monday morning I was driven to the station to ~~take~~ the morning train to Toronto. I arrived <sup>there</sup> in ample time to do some shopping and then to leave by evening train for my home in Unionville.

My life at Maxwell had been happy and, I thought, useful, and I had made many friends, young and old. During all the succeeding years I have looked <sup>with pleasure</sup> back on my coming out into the world ~~with pleasure~~. I tried to teach the children but learned more myself. I have gone back to the old scenes occasionally, the last time (as I write this) on September 26, 1947. I met four of my old pupils,--Mrs. Thomas Beatty (Lilly Long, daughter of Wesley), Lottie Kerton and her husband Hugh Fenwick, and Charlie Heron. Lottie showed me two books which I had presented to her for regular attendance in 1885 and 1886. They were clean and well preserved and she seemed to value them.

A few weeks after I had left Maxwell I received a newspaper clipping which contained a letter from W. Long to the Flesherton Advance. It would seem that a ratepayer, whom I shall not name, had, in an underhanded way, accused the trustees of the school with being extravagant. He did not attend the Annual Meeting of the trustees and make his charge openly but circulated his criticisms in a gossiping way. Mr. Long wrote to the local paper challenging him to answer some questions which he propounded. There was no reply in three weeks, and then Mr. Long, in a lengthy and vigorous letter condemned in strong terms this ratepayer's cowardly behaviour. Among other statements, he said that in only one school section in the township was the school rate lower than in Number Nine.

One portion of the letter referred to me, and I must be pardoned for quoting it. Says Mr. Long: -

I think the majority of the ratepayers will join with me in saying our late teacher, Mr. C. A. Chant, proved to be one of the best, and if Mr. B. had been quite anxious to receive value for the amount paid by him as a school tax, he should have attended our village school, and he would then learn that it is wrong to bear false witness against his neighbors, for morality was taught as well as other branches of education.







## V THE COURSE AT THE UNIVERSITY

The week between Christmas and New Year's passed quickly. My <sup>two</sup> five brothers were married <sup>at the time - Ontario</sup> and had their own homes, and the rest of the family gave me a <sup>very pleasant</sup> good visit. I was able to call on my special friends and was, of course, at several parties in the village. I sorted out the books and papers accumulated while at Maxwell and stored them <sup>away for the time</sup> ~~away for the time~~ <sup>expected to</sup> I ~~should~~ be engaged in my University studies. Then I packed my trunk again with books and clothes, and once <sup>set out for St. Catharines</sup> more to enrol at the Collegiate Institute.

On this occasion it was to pursue the First Year of the Arts Course of the University of Toronto. Why did I not go directly to the University to do this? At that institution the ~~session~~ session began On October 1; <sup>but</sup> and I had continued teaching until the end of the year. I did this because I needed the money, <sup>I should thus earn</sup> and, also, I had a desire to complete my full three years at the school. Further, I believed I should obtain more personal attention at the Collegiate Institute and that it might thus be possible to make up for my deficiencies as a private student whilst I was teaching. Indeed I had heard the remark that this school could show the University how to teach the First Year of the Arts Course! There was some truth in this gentle boast, arising largely from the fact that the student at the University received much less ~~as~~ personal guidance than at a secondary school and in many cases was not so likely to obtain <sup>as</sup> ~~so~~ high a standing at the examinations.

However there is another side to this question, as I found out later. In the first place, there is for most students a 'best' time to change from secondary school to college methods. Then, it should be recognized that passing the final examinations is not the only object in a University course. There are <sup>at the University</sup> various organizations and associations of great value to the student. By doing as I did I was associated with my class-mates <sup>there</sup> for only three years, not four, and it is during one's college course that one's firmest friendships and most important contacts are made. But we cannot estimate <sup>the value of</sup> these social factors with the precision that we can attain in measuring masses and forces and other quantities in physical sciences, and I have always believed that <sup>all</sup> under the circumstances existing at the time I acted wisely.

At the Collegiate Institute there had been several important changes. John Seath was no longer headmaster. He had been chosen an Inspector of High Schools, in which position



he attained great influence and power; and ultimately he became Superintendent of Education. He had much to do with the introduction of technical schools into Ontario. He was well known for possessing ideas of his own and indeed was often described as the 'czar' of the Department of Education.

Into the headmaster's place had stepped ~~up~~ John Henderson. He was a superior classical scholar, but was rather boisterous and impatient in handling the multitude of first-form students. The third of the distinguished trio when I attended the school four years earlier, W.J. Robertson, was still mathematical master, with his great ability and quiet, good judgment. Messrs. Henderson and Robertson, <sup>were</sup> still two ~~of~~ of my best friends. Fifty years later it was my privilege to be entertained at ~~the~~ St. Andrew's College, Aurora, by Mr. Robertson's daughter Evelyn who was dietitian at <sup>that</sup> ~~the~~ institution. She said she believed I was the only one left of her father's scholars in the days when the St. Catharines Collegiate Institute achieved its greatest distinction, attracting advanced students from every part of the Province.

Several new teachers ~~has~~ been appointed, one being Evan J. McIntyre, B.A. 1883, who ~~ought~~ the advanced courses in English which I was trying to take. Mr. McIntyre, I believe, some years later resigned and became a fruit farmer in that favoured section of the country.

A large number of outside students had come to St. Catharines to prepare for Honour Matriculation and for First Year Arts, which two examinations were at this time under the control of the University; and for the examinations for First Class Teacher's certificates, which were directly under the Department of Education. The subject ~~of~~ matter for the University and for the Departmental examinations <sup>was</sup> ~~were~~ practically identical, yet the two authorities set their own examination papers. There was some duplication, but there was also considerable effectiveness, as each educational authority secured more nearly what it desired <sup>than</sup> has been the case in later years when the examinations have been <sup>completely</sup> amalgamated. More recently the number of candidates has been multiplied many times and there is, almost of necessity, too much uniformity,-- all candidates must "squeeze through" the same medium-sized square hole!

Those enrolled for the teacher's examinations were a fine body of slightly older men and women. For years afterwards I continually noted the high appointments obtained by them as school principals and inspectors and in leading educational positions generally.



I must here mention a few of my schoolmates. Among those preparing for the First Year examination with honours in mathematics was David Allan Burgess, whose home was in Norwood in Peterborough County. He had a quick active mind and had many and varied interests. Perhaps he attempted too many subjects as he <sup>failed</sup> to attain high standing in some of them. He <sup>also</sup> played "association" football (soccer) and it was he who introduced me to canoeing and <sup>camping</sup>. We passed through the University together; and after our second examination, in the summer of 1888, he launched a new canoe at Lakefield, and we paddled through the Kawartha Lakes and on to Lindsay and back. I never forgot that trip. I was used to wandering through the woods and fishing in the creek or pond, but paddling and actual sailing on a lake and a real river, and trolling for big fish were new to me. In Toronto Burgess lived in the old Knox College, which was planted in the middle of Spadina Avenue in 1875. He had the Presbyterian ministry as a probable aim, and, having obtained the B.A. degree in 1890, he spent a summer as a student missionary in the North-West. I fear he overtaxed his strength as he was stricken with tuberculosis and although he lingered on for many months, buoyed up with the expectation of recovery, he passed away on November 16, 1893.

Another member of our group was James Colling. His home was in St. Catharines<sup>a</sup> and he had been a student at the Collegiate Institute for some years. He was one of John Henderson's 'star' pupils and became an able and accurate classical scholar. He headed his class each year at the University. Afterwards he became a <sup>a</sup>teacher at Napanee Collegiate ~~Institute~~ <sup>Institute</sup> School and then a public school inspector in Hastings County. He died April 14, 1943, at Bancroft, Ontario. In the '80's and '90's many of the graduates in the honour courses obtained good academic positions in Canada and the United States.

The work in the mathematical subjects proceeded with numerous reviews and 'tests'. The students for honour matriculation had regular periods for the solution of problems, and for the sake of practice we in the First Year joined them in that hour. I was never very 'swift' in handling mathematical problems, but if given time I could sometimes solve them. In the matriculation class was a quiet youth named Robert Henderson, who came from <sup>the village of Dickenson, near Ottawa.</sup> ~~Russell in the eastern part~~ <sup>of the Province.</sup> ~~at that time possessed a post office but it was superseded by the rural delivery.~~ He used to 'shine' at these periods. Mr. Robertson, the teacher, would read out the problems, some of them quite difficult; but <sup>usually</sup> there never was a problem in geometry given out which Henderson did not solve within one minute. To do that one must be a mathematical genius.



When Henderson wrote on the matriculation examination in June-July (1887) he found himself opposed by another genius, with the result: 1. <sup>J.F.</sup>Howard, 2. <sup>R.</sup>Henderson. On the first examination this same order was maintained, but on the <sup>1st</sup> Second, <sup>2nd</sup> Third and <sup>3rd</sup> Fourth examinations Henderson was at the top. Then he was appointed Fellow in Mathematics, an honourable though not lucrative position. Among his duties he was required to teach large elementary classes, but in this he was not so successful. A person does not have to be a genius to be a good teacher -- particularly if the class is a big one in (say) <sup>elementary</sup> Algebra or Trigonometry. Then Henderson secured an important position in the Insurance Branch of the Department of Finance, Ottawa; and a few years <sup>2</sup> later he was carried away to New York City by the Equitable Life Insurance Society, and ultimately became Chief Actuary and a Vice-President of that big organization. When I called <sup>to</sup> to see him in New York I found him sitting on a raised platform in a large room with about one hundred of the actuarial staff at work before him. Every minute or two one of them would come up to ask some question relating to the task he was engaged on, and with no hesitation at all Henderson would <sup>in a few seconds,</sup> give him <sup>t</sup> the desired information and he would go back to his place. All so easy, without apparent effort! It is a gift! Robert Henderson was born <sup>on</sup> at ~~Russell, Ontario~~, May 24, 1871, and died on February 16, 1942, at Crown Point, N.Y.

The Literary Society at the Institute was still very active, the assembly hall ~~being~~ being crowded to hear the excellent programmes. Usually there was an address or a paper, a debate and some musical pieces. Two of the latter stand out in my memory. One was the singing by a young woman and her young brother of "Larboard Watch, Ahoy!" It was a fine old sea song and may possibly <sup>still</sup> be sung, still. I wondered just what the 'larboard' watch was and did not understand the term until many years afterwards when I had travelled much on the sea, -- yet I was greatly pleased with the song.

On the other occasion a young man played the mouth organ in a brilliant ~~and~~ and fascinating fashion. First, he gave a difficult selection from classical music, and then, in response to thunderous applause, gave "When the Leaves Begin to Turn," a favourite waltz song of the day. I do not recall the performer's name, but was told that when a child he ran away to join a circus, <sup>now</sup> and was back on a visit to St. Catharines. He was an artist with his <sup>a</sup> little instrument.



Perhaps I might mention a contribution by my cousin Clara Parkes at whose home I lived. She was quite musical, has an excellent voice and sang in the St. Paul Street Methodist Church choir. At one of the Literary Society's meetings she wished to sing a little sentimental song. She did not remember all the words and asked me to patch it up for her. Her good voice more than made up for the overflowing <sup>metre</sup> ~~metre~~ and it went off well:-

Tell me that you'll not forget me  
 When you've wandered away;  
 I would love if you would let me,-  
 Every hour for you I'll pray.  
 All the joys of this world's treasures  
 Are, when you are far away,  
 Nought compared to your love's pleasure,-  
 Every hour for you I'll pray.

In illustration <sup>ing</sup> of the great migration to the West <sup>of the United States and Canada</sup> in the '80's and of the ambitious undertakings of those who were settled there, I may refer to a letter written from Pendleton, Oregon, November 6, 1888, by my cousin, the singer. Two of ~~her~~ brothers had established themselves there and she and her parents had recently joined them. Also, she said she was a member of the Handel and Haydn Society <sup>E 7</sup> which met every Monday evening for practice. *It bore an imposing name, but aimed high.*

On one of our debates I agreed to take part. The subject was, "Resolved that Chinese immigration should be prohibited." This subject was a live one in political circles at this time. I was on the affirmation <sup>ve</sup> side, although my personal sympathies would be in favour of admitting the foreigner. The affirmative side was declared the winner, but I must say it was not on account of any strong support from me. I was never a free platform speaker, not gifted with natural ~~eloquence~~ eloquence in debate, nor able to think quickly when on my feet.

On the <sup>negative</sup> ~~opposite~~ side in that debate was a First Year student in Classics, <sup>whose name I shall not give.</sup> He was very disappointed that his ~~eloquence~~ <sup>the</sup> eloquence, which was of long-word variety, had not won the decision; and, after the meeting, my friend Burgess and I walked the ~~streets~~ streets, with him between us, for half an hour trying to cheer him up. It was my duty to report the meeting to the local paper, and just before we separated our friend said to me, "You'll give me <sup>a</sup> little puff, won't you, Chanty?" which of course I agreed to do. Years later, long after we had graduated at the University, this little weakness in my friend was recalled when I learned that when applying for



a certain position he had composed a statement commending himself for the <sup>new place</sup> position and had signed to it the name of a well-known professor at the University. One of the sad tragedies of life!

Another feature of the St. Catherine's Collegiate Institute impressed me. In all schools there are examinations of various kinds, to test the progress of the students. In my previous experience at other schools it was customary for the teacher to prepare the questions to be answered and to preside during the examination. There were always some persons who were doubtful of their ability to stand the test and who did not hesitate to ask assistance from a neighbour or to refer to notes carried upon them to refresh their memories. Moreover the sentiment against this behaviour was often not strong; it was <sup>not</sup> considered a very serious crime to do a little "cribbing". I suppose such conduct is on a par with "beating the government", which is readily excused by some people. But here the teacher would write the questions on the blackboard and then go off to other work, leaving us usually a small class, entirely to ourselves. Under these circumstances we never thought of looking at a neighbour's papers or asking him for a hint. We were on our honour to 'play fair' and we responded to the trust placed upon us.

I remember well the subjects in the English language which we studied under Mr. McIntyre, especially the shorter poems of Milton. Among them, of course, were <sup>L.C. Ital</sup> LYCIDAS, ~~LYCIDAS~~ L'ALLEGRO and IL PENSEROSO, which I thought perfect gems. They were quite different from the elevated and resounding <sup>L.C. Ital</sup> PARADISE LOST, for which, however, I had a great, almost <sup>dazzled</sup> ~~FEARFUL~~ admiration. In studying it I made what to me was an original discovery. By simply reading it slowly and clearly, and <sup>L.C. Ital</sup> PAYING STRICT ATTENTION TO THE PUNCTUATION, I could easily follow the poet's reasoning and could make it understandable to others.

The three short poems named had a simplicity, a delicacy of touch and withal a dignity which made them charming. Of course I read other memorial verses, such as Shelley's <sup>Ital</sup> Adonais and Matthew Arnold's <sup>L.C. Ital</sup> THYRSIS, but they did not diminish my high esteem for Milton. As to the <sup>L.C. Ital</sup> SONNETS, I had never studied this form of verse before and when I became accustomed to it there was a <sup>neatness</sup> delicacy and cleverness in construction and a perfection of the whole which appealed strongly to me. I tried



to compose some samples of it but never succeeded. I did not possess sufficient originality in thought or skill in the weaving of words requisite to produce a passable sonnet. Milton and Wordsworth seemed to me especially capable of writing these neat units of literature, but I never had the patience or <sup>the</sup> devotion to appreciate fully the sonnets of Shakespeare, or to attempt to find any hidden meaning in them — but he needs no apologist!

Another subject of study was the early history of the English language, and one text-book I read was "The Origin and History of the English Language" by George Perkins Marsh. This also opened up new fields in which I have ever since enjoyed occasional walks. Comparatively recently I read Richard Henry Dana's "Two Years Before the Mast". The two-year voyage was actually made in 1832-34 and the book was published in 1840. I was surprised to find that one of the persons in the book was named George P. Marsh and that he was a gifted scholar of the English language. The author of the text-book mentioned lived from 1801 to 1882 and the book is based on a course of lectures delivered at the Lowell Institute in Boston in the autumn and winter 1860-61. The author was U.S. Minister to Turkey 1849-54 and to Italy 1861-82.

Dana, the writer, states that when the <sup>L. C. Dana</sup> ~~ALERT~~ <sup>ALERT</sup> the ship on which he was an ordinary sailor, was at San Pedro, California, in May 1835, it took on a young Englishman of about 26 years who gave his name as George P. Marsh. He was well educated, spoke and wrote French with ease, was a fine penman, was a tolerable singer, was evidently well-born and was well-informed on English law and parliamentary government. He said <sup>that</sup> in early life he was on a smuggler between Germany and France and England and had been educated there. His life on ships in the Pacific was full of remarkable incidents, some of which Dana was able to corroborate. He left the ship at Santa Barbara in March 1836. Dana was sorry he was not able to solve the mystery of the man.

It may be remarked that up to this time my studies had not included any science at all, although I found great pleasure in learning about things and <sup>in</sup> observing phenomena. My father was a competent taxidermist and we had a glass case of stuffed birds, including a star-nosed mole! He was also a devoted observer of bugs and had in his collection the first "potato bug" which he saw. (2)



but I was left to 'pick up' knowledge of nature myself. I needed a little technical guidance, but it was not available. The age of science was still some years away! My study of Physics did not <sup>b</sup>egin until the second year of the Arts Course, and I never had any precise training in Chemistry, Botany or Zoology and my knowledge of them is 'full of holes'. Present conditions are very different. I think that for the enjoyment of a full life one should have not just a "bowing acquaintance" with Botany and Zoology but the training should include instruction in the laboratory and in the open air. I always feel the lack of precise 'active' knowledge when I look into a botanical specimen.

The school term passed quickly and <sup>5</sup>Spring soon came. It seemed decidedly milder in St. Catharines than on the north side of Lake Ontario. Along with spring came the University examinations which always began about the first of May. In April I hastened to prepare what was still to <sup>be done,</sup> ~~do~~, and then reviewed the whole year's work. As is usual when cramming for an examination, I worked over the examination papers set in previous years. If any part of, <sup>the prescribed work</sup> ~~whether~~ in mathematics or the languages, was not clear to me I made a note of it, and then consulted the teachers personally. I well remember taking some questions in Latin and Greek to Mr. Henderson. He brushed aside whatever he was engaged on and sat beside me an hour at a time clearing up the difficulties I had encountered. The other teachers were equally cordial and helpful.

At one time all the undergraduates in Arts at the University wore gowns, but by 1887 the fashion was not strictly observed. However, every person writing on an examination was expected to be clothed in his college ~~and~~ uniform. There was in St. Catharines a woman <sup>tailor</sup> ~~tailor~~ who had a reputation for supplying these gowns from good material at a reasonable price, and I was measured for one. I possess it still, and it has been worn by my daughter and granddaughter when receiving their B.A. degrees.

McMaster Hall was erected on Bloor Street, on the north border of the University grounds, in order to provide a home for a Baptist Theological College, and in 1883 it became the Theological Seminary of the Baptist denomination for the whole Dominion of Canada. The students living in it ordinarily.



pursued the Arts course in the University of Toronto and then completed their studies for the ministry at the Hall. The examinations in Theology were held in April and the budding ministers at once left to take their stations for the summer throughout the country. Thus rooms were left vacant, and a number of us from St. Catharines were able to secure a convenient place to live during the examination period. The accomodation was excellent and the McMaster students remaining for their Arts examinations were agreeable company. We were all senior students, but some were not too old for school-boy pranks. They soon 'spotted' the ones they could play practical jokes on. I remember one unsuspecting person whose bed was so tampered with that when he got into it the mattress dropped to the floor, with one side much higher than the other. The innocent fellow did not realize that he was the victim of a trick, but thought the bed was broken and he tried to sleep on it in that cocked-up position all night. In another case granulated white sugar was put in the bed of the <sup>very</sup> person who had asked me to give him <sup>it</sup> a puff in the newspaper. He suspected who did it, -- <sup>it was</sup> a St. Catharines lad.

The first paper of my examination was on Thursday, May 5, and the thirteenth and last was on Saturday, May 21. When it was all over I gathered together the text-books, new or second-hand, which I should require for the next session, and took the train for home. I felt happy to be an active student again, and I intended to make, during the vacation, a serious assault upon the Differential Calculus and the Analytical Geometry of three Dimensions, which I was told were subjects of the second year. I hoped to make some progress in them before the opening of the College in October.

Early in June the examination results were published in the morning paper and you may be sure I carefully scrutinized them. In Mathematics there were eight in First-class Honours, the first four being:

1. A.T. DeLury, 2. F.L. Sawyer, 3. J.B. Reynolds, 4. C.A. Chant.

Sawyer and Reynolds, I learned, had passed the matriculation examinations the year before, the former standing first, the latter third, in First-class Honours. Sawyer continued in the course and graduated in 1890. Reynolds after this examination dropped out for three years, and then returned to complete the



course, graduating in 1893. He was then appointed to teach Physics at the Ontario College of ~~Education~~ Agriculture at Guelph and in time <sup>he</sup> became its President. <sup>1948.</sup> Delury had passed the matriculation examination in 1882, had then dropped out until October 1886, when he enrolled <sup>at the University</sup> in the First Year, and now he headed his class. I shall not say much more about him here. We all recognized him as a superior mathematician, but in addition he had a maturity of outlook and a broad comprehension of many other subjects which the rest of us did not possess.

In the department of English there were nine in the First Class. I was the seventh and my friend Burgess eighth; and there were twenty in Second Class. I was well pleased with the results.

## VI At the University

### Professor Baker

When the first of October 1887 came round I registered at the University for the 1887-88 session, i.e. <sup>for</sup> my Second Year in the Arts Course. The scene was new to me and I walked about the corridors <sup>of the great building</sup> and read the notices posted up. Professor Alfred Baker was pointed out to me as he passed along and I hailed him as "Mr. Baker" and asked about the lectures in Mathematics which I had to take. He was courteous <sup>but</sup> ~~and~~ quite dignified in giving the information. I wondered if I had offended him. I had seen his name in the Canadian edition of Hamblin Smith's "Elementary Algebra" to which he had contributed an appendix containing <sup>in</sup> recent examination papers on the subject, and he was stated to be Mathematical Tutor in University College. I had not heard that he had been promoted to be Professor (1887) nor that he was Dean of Residence (since 1885), and I feared I had made a 'break'. However I did not wish to be considered in the slightest degree / 'fresh' as a reputation for such behaviour might lead one to harsh treatment. I was more cautious after this.

I may say that Professor Baker and a Fellow ~~(who was a recent graduate appointed for the session at \$500.00)~~ were responsible for all the instruction in Mathematics in the four years of the Arts Course. In the session 1887-88 there were 382 students <sup>in Arts</sup> in attendance <sup>at the University.</sup>



Professor Baker ~~and~~ was a good mathematician, but his teaching of any branch of his subject was quite unlike that in a high school, as <sup>I suppose</sup> one might expect. He lectured on the subject, seldom going into minute details and never assigning so many pages "for the next lesson", or giving tests on what had already been taken up. The honour classes were ordinarily small (there were nine in second year Mathematics) and we could ask questions; but the matter being <sup>outlined or</sup> explained was usually difficult and we students were not sufficiently master <sup>of them</sup> of it to ask useful questions. We really had individually to ponder the hard parts by ourselves at home, and then we might ask for assistance from some one else. Indeed a person's education is of little value unless he learns to think for himself.

There was another reason which made us hesitate to 'speak out' in class--the clever professor was inclined to be sarcastic. ~~And~~ I may refer to an incident which occurred ~~on~~ one day. In one of his lectures Professor Baker was making a little computation and he asked if any one had a book of tables with him. My ~~ch~~ Whitelaw had a copy of "Chambers's Mathematical Tables" and he handed it over. While Professor Baker was thumbing ~~through~~ over the leaves to find the numbers he wanted he came upon a pair which were uncut. He held up the book, opened it at the place where the two leaves were joined together, peered into it as though he were trying to read the numbers on the inner pages, and then remarked, "It must be interesting to study a book that way!"

Of course no one expected him to treat us as rank beginners in mathematics although we really had not advanced very far. Usually he did intimate what part of the subject he could discuss next day, and we special~~l~~ students were supposed to read the text-book, and perhaps other texts, in order to understand his lecture. In after years I got to know him well and to admire his ability. He received his B.A. degree in 1869, and he died October 27, 1942, aged 94, and I had the honour of acting as a pall-bearer at his funeral.

#### COLLEGE CONVOCATION

According to the College Calendar Michaelmas Term began on October 1, which was Saturday in 1887, and Lectures on October 3. As a matter of fact lectures lagged behind this date. By the time the classes were organized and



Serious study began it was about the 12th of October. The students, other than those of the First Year, knew of this <sup>usual</sup> delay and many of them did not come to the University until the second week of the term, and <sup>indeed</sup> some of the men who had employment during the summer stayed on their 'jobs' until even later. This condition of affairs continued for some years after I graduated, but the slowness of getting started and the waste of students' time was finally corrected many years ago.

College Convocation was on Friday, October 14. It was held in Convocation Hall, which then occupied the north half of the east wing of the Main Building. The public went up the stone steps (still there) into the east door and then turned right to enter the Hall. A large company had gathered before two o'clock, and, if I remember <sup>correctly</sup> right, the first and second year students were directed to raised seats running longitudinally on the west side of the Hall. Some of the seniors and some members of the Glee Club were in the gallery, which was across the south end of the room. ~~XX~~ They indulged in songs and in numerous remarks about persons on the ground floor. A student who was well known to his mates, or any one else who was recognized in the audience, might be the subject of some--occasionally witty--remark.

In the meantime the President, members of the Staff, and invited guests had assembled in the Senate Chamber, which was upstairs in the south part of the <sup>east wing</sup> of the building, and had arrayed themselves in gowns and caps. At the proper time a procession was formed and moved north <sup>ward</sup> along the corridor, down the steps, and entered the Hall, being led by the Esquire Bedel, Sergt. McKim, carrying the mace. As the old soldier marched proudly up the aisle some one in the gallery called out, "There goes the man who owns the University!" This was followed by other similar "gags". The President and the others in the procession moved forward and took seats on the ~~dais~~ <sup>dais</sup>, otherwise 'platform'.

After the opening exercises the winners of medals and scholarships at the day examinations were called in succession to the ~~dais~~ <sup>dais</sup> and were presented by the President to the audience. Then Dr. Daniel Wilson, the President, gave the Convocation Address.



His subject was "University Federation". As early as 1883 this project had been suggested. There were several denominational universities and colleges in the province which were finding it difficult to secure funds to meet their increasing expenses, and it had been suggested that they might unite with the Provincial University in a plan by which the University would bear the cost of instruction in the more expensive subjects (such as the sciences) while the uniting college would retain its own Arts Faculty by teaching the Humanities (classics, etc.) and could also have a Faculty of Theology if it desired. Overtures were first made to Victoria College, which had been in operation by the Methodist Church since 1836 and was located at Cobourg. After long discussion and negotiation the General Conference of the Methodist Church in 1886 approved the scheme of federation — but by a small majority. In the next year 1887 the Provincial Legislature passed "An Act Respecting the Federation of the University of Toronto and University College with other Universities and ~~Colleges~~ colleges". But it was not put in force at that time. During the next four years information regarding University Federation was spread sedulously throughout the Methodist Church, and at the General Conference of 1890 it was unanimously approved. The Act was then proclaimed, on November 12, 1890.

President Wilson had always been opposed to Federation. He was rather conservative in his views and was not friendly to the advanced <sup>proposals regarding</sup> ~~principals~~ of the Methodist Church. He was also suspicious of some of these innovations, especially <sup>those supported</sup> by the Provincial Government, which had been niggardly towards the University and which he feared might <sup>be willing to</sup> ~~despoil~~ it in favour of the other institutions. However at the <sup>University College</sup> Convocation of October 1886 Dr. John Potts, Secretary for Education of the Methodist Church, and Dr. S. S. Nelles, Chancellor of Victoria, were on the Convocation platform <sup>with him</sup> and were loud in praise of President Wilson as well as full of hope for Federation. Dr. Wilson had come to see the wisdom of the scheme and now generously supported it.

The actual consummation of <sup>the</sup> Federation of Victoria with the University of Toronto, of course, did not ~~take~~ <sup>bring about</sup> take place immediately. To ~~make~~ the actual organic union required time and much thought. The old property at Cobourg



had to be disposed of and new buildings had to be erected in Toronto. Also, many changes and adjustments in the staff were necessary. But at the opening of the session 1893-94 there was a complete consolidation of work with the University of Toronto. It was my privilege to be on the staff of the University of Toronto from 1891 <sup>to</sup> 1935 and I was happy to assist in making Federation a success. The example of Victoria was followed by other institutions, the names of which I shall not mention. At first there were difficulties and petty annoyances, but the spirit of toleration and co-operation amongst the leaders triumphed over all obstacles, and now the University of Toronto with its federating <sup>ed</sup> bodies compose one of the world's largest and noblest organizations for the advancement of knowledge in all branches of culture and research.

But <sup>to me</sup> the most enthralling portion of the Convocation ~~preceedure~~ proceedings was the singing of the students. Up there <sup>in the gallery</sup> trained members of the Glee Club led the students <sup>who</sup> and they sang with a swing and precision the tuneful college songs, and everybody seemed to join lustily in the choruses. When Convocation was dismissed and the audience stood <sup>while</sup> <sup>official</sup> the procession marched out <sup>to</sup> the song "Vive la Compagnie" burst forth:-

Here come the senators all in a row,  
Vive la Compagnie!  
But what they are good for I really don't know,  
Vive la Compagnie!

and soon for all the rest <sup>of the verses.</sup>

The other song which seemed to <sup>to</sup> strike nearest ~~me~~ was Litoria with its threat ad initiandos tirones:-

Ye blooming freshman dons: his gown,  
Swee-too-wee-tum-bum!  
And walks ye earth with awful frown,  
Swee-too-wee-tum-bum!  
He sees ye maiden's glances sly,  
Swee-too-wee-too-hi-ro-si,  
And rolleth his magnetic eye,  
Swee-too-wee-tum-bum!

Chorus: Litoria, Litoria, &c , &c., ad. lib. cum strepitu magno.

When most of the audience had left I walked out, <sup>thinking of the last lines of Lycidas:-</sup>

At last he rose and twitched his mantle blue:  
To-morrow to fresh woods, and pastures new.



I may say that in those days there was much singing in the class rooms and at other gatherings; and it was during <sup>this time</sup> my ~~Second Year~~ that the admirable "University of Toronto Song Book" was prepared, with James Edmund Jones of '88 as editor. Jones was widely known <sup>in later years</sup> for his devoted service to ~~the~~ boys and young men in athletics, camping, and nature study (<sup>the study of</sup> including fungi by the Fun Guys). In 1920 he was appointed Assistant Police Magistrate for Toronto and performed his duties until his retirement in February 1939, four months before his death. <sup>venture to</sup> I think he will be remembered longest for his lovely musical setting to the Twenty-third Psalm, which is to be found in several church hymn books. The tune is named "Walden". The University Song Book was published December 9, 1887.



Looking back over the decades, I recall that every few years there was an ~~outcry~~ outcry that the State University was a godless institution, and Daniel Wilson, the President of the University, and other loyal friends would hurl back the accusation as false and malicious. The attacks were not uncommon during the 'eighties', at which time the results of scientific investigation began to be more <sup>widely</sup> circulated, and some timid persons may have been fearful that their religious beliefs would have to be given up. Occasionally, also, some one in authority would unwittingly drop an unwise remark which would light a little flame and that would be fanned into a big blaze by the newspapers. But I believe ~~that~~ these unfounded charges arose chiefly from the narrow religious views <sup>held by</sup> of some persons.

President Wilson had stated that as the University of Toronto was a state institution it <sup>could</sup> offer instruction only in secular subjects, and for this he was viciously attacked. A high-church clergyman in Oshawa fiercely asserted that this was "awful and most blasphemous atheism". Apparently the cleric confounded 'secular' with 'sectarian', but even then his harsh statement was not veracious. Further, there are some people <sup>who</sup> who are always ready for a heresy hunt. Sir Daniel Wilson was a low-churchman and an earnest Christian. He died in 1892, after <sup>several</sup> thirty-nine years on the University Staff.

The University of Toronto has always recognized officially the Christian religion. The familiar Main Building, as it was called when I was a student, or University College, as it is now designated, was finished in 1858; and the west wing comprised a residence for the undergraduates. According to the regulations, formal prayers were read by the Dean of Residence at the morning and <sup>the</sup> evening meal. With the passing of the years the Residence became too small to accomodate all those in attendance. It was also out-of-date and there was a demand that it be discontinued. Apparently it had served its time, and conditions had greatly changed. But that was not the only place where there were religious exercises. The Calender of University College states that the work of the College would be opened each day at 10 a.m. with prayer "at which all who have no conscientious objections are expected to be present". This service was inconvenient for those who lived any considerable distance from the Main Building, and the attendance was not large. I had few lectures in the building at that hour and seldom was able to be present.



99 96 quite

The religious exercises mentioned above were very proper and desirable, but <sup>quite</sup> early there was expressed among the students a desire for something of a more active, living nature, and in 1873 the University Y.M.C.A. was organized. This continued to operate and to grow in importance, and after some of the 'godless' attacks there was a strong demand for a suitable building to be a home for the College Y.M.C.A. An appeal for funds was made in December 1884 and brought a ready response. The list of subscribers was headed by Hon.

S.H. Blake, who was well known in legal and religious circles and who was one of the prime movers in establishing in 1877 the Protestant Divinity School which some years later was named Wycliffe College. Other prominent citizens, chiefly business and professional men, made generous contributions, and the staff and students of the University added a considerable amount. The total receipts were \$6765 and ~~(the construction of)~~ the building was erected in 1885. Its site was south-west of the Biological Building, among the fine beech and maple and oak trees which covered the grounds. The material was red brick with brown stone trimmings. The front entrance was at the south-west corner and the door faced south. The recessed porch was supported at the corner by a handsome polished granite column. As I remember the building, its dimensions were about 35 by 40 feet, and it contained an assembly room, which could be enlarged by a movable partition, a committee room and the secretary's office.

When plans were being drawn for the wonderful Hart House an attempt was made to provide suitable accommodation for all the extra-curricular activities of the students, including the Y.M.C.A. During the First World War the great building was sufficiently advanced to be utilized for military training; and after the Armistice <sup>in 1918</sup> it was pushed to completion. At as early a date as possible the Y.M.C.A. moved into its new and commodious quarters. This was about 1921, and just at this time the discovery of insulin by Banting and Best was announced. The preparation of this marvellous substance was actually carried on in the old Y.M.C.A. building. Then the Rockefeller Foundation offered funds for the Hygiene Building and the little old building was torn down and the new building was erected on its site. It was completed in 1927, and from that time the precious material to lengthen the lives of millions of people has gone forth to all parts of the world.

While teaching up-country I subscribed to a Toronto daily paper which often carried news of the University, and as I expected to attend it before long I read everything that related to it.



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Thus I had some knowledge of the 'godless' attacks on it, the erection of the Y.M.C.A., the progress of University Federation, the Mathematical and Physical Society and other things.

so when I arrived at the University I was keen to see some of the persons and the objects which I had read about.

Not many days after registering as a student of the Second Year I received a card which read:—

The Members of the  
University College Y.M.C.A. do hereby  
request the pleasure of  
Mr. C.A. Chant's company  
On Tuesday, October 18 from 4 to 6 p.m.  
J.A. Sparling                      A.M. Young  
President                              General Secretary

Archibald Hope Young graduated in 1887 and was General Secretary practically all the time I was an undergraduate student. He was a good Presbyterian but a few years later he was chosen to be Professor of Modern Languages and Registrar at Trinity College, a good Anglican institution, <sup>He</sup> ~~and~~ remained there many years. — <sup>and died</sup> ~~until his death in 1935~~. After him Hugh B. Fraser '90 was General Secretary but within a year he became Secretary of the Y.M.C.A. at Quebec City, and his successor was John McNicol '91, who afterwards was head of the Toronto Bible College for many years.

Of course I accepted the invitation and was pleased to meet many of the <sup>l.c.</sup> staff and students. This reception was specially for the Freshmen and I was a 'second year' Freshman.

The new building was well suited for its purpose. I found the General Secretary was in his office daily from 4 to 6 p.m. and that members of the committee were on hand at other hours to give advice to the students and to look after the property.

Early in the second term of the session, namely on January 19, 1889, there was an At Home to members of the Medical Students' Y.M.C.A. and <sup>of</sup> the University College Y.M.C.A., in the ~~latter's building~~ <sup>latter's building</sup>. This led to new acquaintances and to good will between the students of the two faculties.

The Medical Students' Y.M.C.A. was organized in 1885. The president in 1887-88 was E.G. Smith who ~~was~~ graduated in 1892 and went to India. The Medical Y.M.C.A. gave large support to Dr. R.A. Hardie who in August 1890 went to Korea. The missionary spirit was likewise strong in the Arts Y.M.C.A. J.S. Gale '88 went to Korea, William Gould '89 to Formosa and W. Harvey Grant '89 to Honan, China. They were splendid fellows and gave admirable service in the



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foreign field.

The chief 'regular' religious meeting for the students was ~~at~~ at 5.00 p.m. each Thursday. It was a simple devotional service led by selected students, with occasional addresses by leading citizens, such as President Wilson, Rev. E.A. Stafford and the Hon. John Macdonald, a noted merchant.

On January 19, 1888, the speaker was H.J. Cody, and his subject was "The Shining Face" (Exodus 34:29). This was the first occasion on which I saw Harry Cody in action. He read clearly the passage in Exodus which describes the coming down of Moses, with the Ten Commandments from Mount Sinai, after his long communion with God, and how his face shone although he himself was not conscious of it. The speaker pictured in words each part of the narrative and made ~~practical~~ practical application to one's own personal life. Many of the students could not speak freely and easily on a religious topic, but Cody's language was simple, eloquent and effective. As he concluded, he knelt down and offered a ~~prayer~~ fervent extempore prayer. His hearers were simply carried away! I was astonished, being especially surprised that the young evangelist was a member of the Church of England.

On a hill a mile north of my home-village there was an 'English Church', attached to a glebe farm. In my earliest recollection of it, the rector was G.S.<sup>J.</sup> Hill, a B.A. of the University of Toronto of the class of 1858, on whose fitness for his position derogatory remarks were passed along by some non-episcopal persons. Older members of my family remembered him as a public school inspector. Some years before his time the pulpit was occupied by the noted, perhaps notorious, V.P. Mayerhoffer, whose book, "Twelve Years a Roman Catholic Priest" (1861) I remember seeing in our home <sup>and reading</sup> when I was a youth. Mr. Hill's successor was John Fletcher, M.A. He and his wife were often seen in the village in his low-hung phaeton, and I <sup>believe</sup> ~~am informed~~ that he or his son sometimes drove to the railway station and brought away an oaken keg <sup>which</sup> ~~while~~ many regarded with disapproval. But the most notable feature of the church was its isolation from the three other churches in the village — both in space and in spirit. As far as I could see, it did not ~~at~~ co-operate in any way with them. The rector wore spectacles with thick lenses and never glanced at me or the other boys and girls who did not belong to his flock. But here before <sup>me</sup> ~~one~~ was a college boy, just past his nineteenth birthday, who was full of warmth and enthusiasm, and bubbling over in his religious association with his fellows.

Just twenty years after this address I was giving a lecture in the village of



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St. George, near Brantford, and was hospitably entertained in the home of a devout Baptist, who the next morning had family worship. The passage of scripture he read was that chapter in Exodus describing Moses' shining face. When I got home I wrote a note to my friend, who was now at the great St. Paul's Church, and who had recently suffered an undeserved disappointment. And related my little experience, and I asked him if he remembered the address he made in 1888 at the College Y.M.C.A. He replied that the occasion stood out in his memory. I am sure it did in the memories of many others who were present at the meeting. I wonder how many of them are still in the land of the living and recall "the shining face" now, in 1948, sixty years after!

In the programme for the spring term of 1889 W.G.W. Fortune and I were assigned to the meeting for Thursday, February 21, and the subject chosen was "Seeking for Christ" (Matt. 2:1). I remember reading the opening chapters of <sup>BEN</sup>"Ben Hur" (published 1880) in order to obtain Lew Wallace's conception of the Wise Men from the East and their journey to Bethlehem. It was novel and realistic to me. Fortune was a Knox College man, older and more experienced than I. He spent many years leading the forces for Temperance and Moral Reform in British Columbia. But for some reason which I do not remember, the programme was changed and I was asked to join A.P. Northwood in leading the meeting on Thursday, March 21, when the subject was, "What think ye of Christ?" (Matt. 22:42). Northwood's home was in Ridgetown and he was in the year behind me. He passed his third examination in May 1890, <sup>and obtained the B.A. degree in 1891. of the latter year</sup> In the following summer he and three companions lost their lives on a canoe-trip on the French River. His sister Mrs. Richard Davidson was long a useful member of the Toronto Public Library Board.

The General Secretary found other ways to engage the attention of the students. Among these, he organized small groups for Bible study, utilizing a programme which had come to him from the United States. I was one in a group of three, the others being H.J. Cody '89, Anglican, and J.H. Hunter '88, Baptist.

The mingling together of students at the University is an effective means of creating mutual interest and understanding, and thus leading to a feeling of unity; and those who worked together in the Y.M.C.A. were undoubtedly led to brush aside sectarian prejudices. I am sure University Federation and the Y.M.C.A. have been powerful factors in bringing about <sup>in Ontario</sup> Church Union and also active co-operation in cases where there is not actual union.

The Toronto City Y.M.C.A. was very active in the 'eighties'. I still possess a card inviting the students to a reception in the "New Building" on Yonge Street on Tuesday,



January 17, 1888, at 8 p.m. The entire building was open for inspection and I was much interested in the extensive preparations for assisting the young men of the city.



1. Mathematical and Physical Society

I joined the Mathematical and Physical Society on November 1, 1887. The first set of officers of the Society were elected on January 27, 1882. The President was W.J. Loudon, B.A.; Vice President, J.M. Clark; Sec. Treas., D. Burns; Corr. Sec., T.G. Campbell. There were four Councillors in Arts and two in Practical Science. The <sup>members</sup> numbers were pretty well limited to those persons specializing in the mathematical sciences. In a few years the students in Practical Science became numerous enough to secede and form a separate body which they called the Engineering Society. The meetings were held fortnightly on Tuesday afternoon in Room 8 (with the rising seats) in the west end of the Main Building. I loyally attended these meetings although some of the papers were quite above my head. Perhaps one might be contributed by a distinguished mathematician or an address be given by an able graduate <sup>on some very special subject.</sup> At any rate we would not run away, but <sup>would</sup> sit it out <sup>to the very end.</sup> Another feature was the solution of problems sent in. As I have remarked, some members were much more competent at this than were others. But even though a person may not be able to solve a problem himself he takes pleasure in seeing a neat solution given. Often interesting physical experiments were performed.

During the session 1902-03 the constitution of the Society was changed so as to choose a graduate for Honorary President <sup>and</sup> ~~but~~ an undergraduate for President. Still later the solving of problems fell into disfavour, and after <sup>this</sup> a real innovation was introduced, namely, to begin the meeting with a cup of tea as a preliminary get-together. I think this <sup>practice</sup> was copied from abroad; certainly the attendance was increased.

I used to take much interest in the Society. I was Secretary and then President, and enjoyed preparing papers and making up good programmes.

2. Literary and Scientific Society

The Literary and Scientific Society was intended for students in all courses, and its meetings were held every Friday evening in Moss Hall. This building was a part of the old Medical School erected about 1850 and was located where the west portion of the Biological Building now is. In addition to the room to meet in there was a reading room and also a gymnasium. I remember putting on the boxing-gloves for a bit of friendly sparring, but I did not repeat the performance very often.

I attended the meetings of the Literary Society regularly. The programme usually consisted of a song, an essay and a debate. For the latter we were asked not to choose political subjects.



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Every portion of the programme was generally very good and the members <sup>were not stingy with</sup> ~~did not skimp the~~ applause.

Each session there were several public debates held in Convocation Hall. On February 24, 1888, there was an Inter-Collegiate debate, University College vs. Queen's University, the subject being: Resolved, that the American system of government is superior to the British system. The speakers were: Affirmative, T.A. Gibson and G. Waldron (Univ. Coll.); Negative, E.H. Horsey, and W.J. Patterson (Queen's). The chairman was Goldwin Smith. *Gibson was my old mate in public and high school, and Patterson was my predecessor in the Mansfield public school.*

Then on November 8, 1889, the 141st Public Debate was held. On the programme were two Glee Club choruses, an inaugural address by W. Harley Smith, B.A., M.B., President of the Society, a reading by W.C. Hall, and a debate on the subject: Resolved, that it is both just and expedient to raise the whole revenue of the State by a tax on land. The speakers were: Affirmative, A.T. DeLury and N. MacMurchy; Negative, G.R. Faskin, D.H. McLean. Chairman: Sir Daniel Wilson. The programme for the meeting was printed by The University Press which had just started operations. I took much interest in the Press, and got the programmes for the special meetings of the Mathematica<sup>l</sup> Society printed <sup>then</sup> in an original design.

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The 142nd Public Debate was on December 15, 1889, and as it is of historic interest I quote in full the account of it given in the Minute Book of the Society.

The 142nd public meeting of the Society was held this evening, Prof. Baker in the chair.

The program opened with a selection by the Glee Club, which, though only six strong, sang "Gaudeamus Igitur" in good form.

Mr. Kerswill read his selection, "By the Alma after the Battle", in a very effective style.

Mr. P.J.A. Davidson's essay on "Tobacco" was well received.

The debate was on the subject--"Resolved, that the Federation of the Universities of Ontario would be in the interests of Higher Education!"

Messrs. C.A. Chant and G.A. Wilson affirmed, while Messrs. W.H. Graham and J.S. Scott denied.

The debate was conducted very ably by both sides, the speakers shewing that felt more than a passing interest in the important question.

The chairman gave his decision in favor of the affirmative.

The meeting then adjourned.

W. Harley Smith, Pres't

J.B. Peat, Rec.-Sec.

This was the last public debate in Convocation Hall, which was destroyed by fire just two months later--on February 14, 1890.

At the ordinary meeting of the Society on January 13, 1888, A.T. Hunter, a well-known undergraduate, gave notice ~~of motion~~ that at the next meeting he would move: Resolved, that the House Committee be recommended in selecting a list of periodicals for the consideration of the Society, to have an eye to the needs of symmetrical culture.

We thought this a sort of joke, of which the mover was quite capable, but when, a week later, he spoke to his motion he made the most eloquent and best-considered address I heard at any meeting of the Society. The tag "symmetrical culture" was attached to him ever afterwards.

The election of officers of the Literary Society was held in March; I shall speak of that later.



## Results of the Second Year

The work<sup>109</sup> in the second year of the course for honours in mathematics was said to be the  
 hardest of the four years. <sup>Certainly</sup> I found it difficult enough, and when spring came I felt that I  
 had done my best to comprehend it. In English we had to study selections from Milton, Dryden  
 and Spenser, and also <sup>to</sup> read critically Shakespeare's HENRY V, Part 2. But in addition to this,  
 Professor Keys gave us a list of some eight plays illustrating the successive periods of Shake-  
 speare's career as a writer of drama, as outlined by Dowden in his Primer of Shakespeare. I  
 had the use of Verplanck's three volume edition of Shakespeare, with its numerous illustrations,  
 and as I read these plays I felt I was really getting acquainted with our greatest poet.

In April, as usual, I went home to review my work and to prepare for the examinations. It  
 was the end of a long pull. When the results were published the following was the list of  
 those who obtained First Class in Mathematics and English.

MATHEMATICS - 1. C.A. Chant, 2. F.L. Sawyer, 3. W.S. Percy, 4. D.A. Burgess, 5. Miss G.  
 Lawler.

ENGLISH - 1. F.C. Armstrong, 2. Miss G. Lawler, 3. C.A. Chant and Miss L.L. Ryckman (Aeq.),  
 5. H.A. Dwyer, 6. F.J. Davidson, 7. J. Brebner, 8. S.B. Leacock, A.A. Macdonald, Miss J. Stork (Aeq.).

In Mathematics I should not have stood first if my friend A.T. DeLury had not been ill  
 during the examination. He was given an ~~agrotat~~ <sup>agrotat</sup> with first class honours, a very exceptional  
 award. However being ranked first, I received a \$60.00 scholarship, which was of decided  
 assistance to me.

during a part of May and unable  
 to write on some of the examination  
 papers. However he had written  
 on enough of them to be given  
 agrotat standing and credited  
 with first class honours, - a very  
 exceptional recognition. Through  
 his ill fortune I was ranked  
 first and was awarded a

How about  
 2nd cl. too?

"Hoping next"

achievement



HAZING AT THE UNIVERSITY

began

Just when the practice of hazing/at the University ~~began~~ of Toronto, I do not know.

In some United States colleges it was well entrenched many years ago, and I suppose it was easily introduced into Canada. The seeds of thistles and other undesirable weeds soon get into ~~the~~ the air and are quickly wafted over large areas.

The "Oxford English Dictionary" gives five meanings to the verb to haze, the third of which is,—

- { 3. To subject to cruel horse-play (as practised by American students): to bully (U.S.) 1850.

A college students' residence is about <sup>the</sup> most likely place for hazing to flourish. ~~The~~ The form of the horse-play <sup>varied</sup> ~~may vary~~ and sometimes the victim suffered serious injury. At Toronto hazing was quite the ordinary occurrence with each new body of freshmen, ~~and~~ Occasionally the proceedings would be specially objectionable and someone would supply a newspaper with an account of what took place. This would lead to an uproar and the good name of the University would be injured. It has often been remarked that while singly and individually the persons in a large group may <sup>a</sup> appear to be civil<sup>i</sup>zed, cultured gentlemen, yet when they get together they sometimes commit unexpected and unjustifiable acts. Such a remark might almost be made regarding some bodies of elected law-makers!

The performance put on at Toronto was usually in the form of a court trial, in which a 'freshman' was charged with some crime, such as: (1) casting a glance at a young lady, (2) spitting on the virgin lawn, ~~or~~ (3) wearing a stylish bright-coloured tie, or (4) being 'cheeky' to his seniors. There were the usual court officials, — the Crier, the Mufti (Judge), counsel for the prosecution and for the prisoner, constables, &c. The 'show' was held in the basement of the Main Building which was easily/~~acceptable~~ accessible to the Residence men, and which had to be lighted with candles or an odd oil lamp, as gas was not available <sup>then</sup> and electric lighting ~~had~~ had not been invented. The whole was a huge burlesque and there would have been little objection to it, either from the authorities or <sup>the</sup> freshmen victims themselves if the latter



*had been*  
~~were~~ treated in a decent human way; but actually they would be lured to some gathering, <sup>where they</sup> would be  
<sup>in</sup> seized and kept/uncomfortable and degrading conditions. <sup>until the date of the trial</sup> I was never at a hazing party but some  
my friends had been and they described what they saw.

By the time I entered the University there had grown up a strong sentiment against the hazing practice. I think it was related to the feeling against the old Residence. It was thought ~~they~~ both should be abolished. <sup>Often</sup> Letters in <sup>L.C. 1st</sup> VARSITY condemned ~~the~~ hazing. I may quote from a communication in the issue of December 3, 1887, signed by F.J. Steen, then in his fourth year and one of the most highly respected of the undergraduates. He stated that he had been present at a hazing and he did not spare his adjectives. <sup>in describing it.</sup> I quote a small portion of his letter:

.... a certain low practice born in secrecy and carried out in darkness annually among our undergraduates.... senseless, cowardly, degrading, loathsome practice of hazing.

.... a profane and despicable proceeding.... (for) coarseness of jokes, for vileness of language, for inhuman conduct....

I had been at the University only two months when this letter was published. The subject was much discussed amongst the students, and a month or more later a Manifesto was drawn up condemning the practice of hazing and calling for a meeting of undergraduates <sup>to discuss it.</sup> This was signed by thirty-seven of the students. Before I finished my Arts Course I became acquainted with almost every one of them and can say that they were the outstanding and highly respected ~~the~~ leaders in the faculties of Arts and Practical Science. It is a historic document and I preserved my copy. It reads as follows:—

### HAZING

To the Students in Arts and Practical Science

#### GENTLEMEN

The hazing for the year is past; its effects have been carefully studied; the general opinion of the undergraduates have been obtained both directly and indirectly; and we now feel that, as undergraduates having the interest and honour of our college at heart, it is advisable for us to bring before you some facts and opinions bearing on this matter, with a view to taking decided action.

#### WE BELIEVE

1. That the hazing in this college is not what its most respectable advocates



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claim it should be, but it is seriously objectionable.

2. That hazing tends to lower the moral tone of undergraduate life, and renders difficult all true attempts at social union.
3. That hazing tends to increase the lack of respect towards undergraduates in the city.
4. That through hazing personal illfeeling is aroused, that endures throughout a whole college course.
5. That hazing is too often accepted by the first year as an intimation to refrain from active interest in the affairs of college life.
6. That the college authorities earnestly desire the discontinuance of hazing.

Believing, therefore, in view of these facts and opinions, that the majority of the undergraduates will be found to favour the discontinuance of hazing, we, the undersigned, venture to call a meeting of all undergraduates in favour of a movement in that direction, in

MOSS HALL

on Wednesday, February 1st, 1888, at 4 o'clock P.M.

|                |                |                 |                |
|----------------|----------------|-----------------|----------------|
| J.A. Duff      | H.J. Crawford  | F.J. Steen      | J. McGowan     |
| J.E. Jones     | T.R. Rosebrugh | J.N. Dales      | W.A. Bradley   |
| H.C. Boulthbee | E.C. Jeffery   | H.A. McCullough | J.A. Giffen    |
| E.A. Pearson   | J.G. Harkness  | E.G. Hogarth    | W.A. Lamport   |
| H.J. Cody      | W.M. Allen     | H.B. Fraser     | G.W. McFarlane |
| F. Tracy       | W.H.P. Spotton | W.J. Fenton     | J. Gill        |
| J. McNichol    | W.C. Ferguson  | T.C. DesBarres  | G. Logie       |
| A.T. DeLury    | F.C. Armstrong | J.J. Ferguson   | J. Brebner     |
| C.A. Stuart    | F.H. Graham    | T.D. Rockray    | W.C. Gemmill   |

A.P. Northwood

Lulbert

The College Council also took a hand in the matter. Apparently they had paid no attention hitherto to hazing but considered it an established institution. In the Archives of the University there is a photostat of a lithographed diploma, or certificate, granted to Samuel Schultz in 1885, which is worded thus:

Samuel Schultz  
Testatur Senatum  
Universitatis Collegii  
Societatis ad Initiandos Tirones  
A.B. Thompson  
Mufti

I remember Schultz, who, I believe, was a son of Dr. Schultz of Winnipeg, well known in Canadian History. He graduated in 1888 and so was a freshman in 1884-85. A.B. Thompson



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was in his fourth year when he acted as Mufti. I understand he lived in Penetanguishene.

The Council passed the following regulation:—

All interference with the personal liberty of any student, by arresting him, or summoning him to appear before any tribunal of students, or otherwise subjecting him to any indignity or personal violence, is forbidden by the Council. Any student convicted of participation in such proceedings will forfeit the certificate required for admission to the University examinations; and will render himself liable to expulsion from the University.

I remember the <sup>promulgation</sup> promulgation of this regulation. It does not appear in the College Calendar for 1888-89, and I have not been able to consult that for 1889-90, but it is printed in the Calendar for 1890-91.

I may state that as early as October 1886 the Insurance Companies objected to the use of the basement of the University College <sup>building</sup> for holding meetings.

The action of the students themselves <sup>brought about by the above Manifesto</sup> practically put an end to hazing in University College, although there were <sup>a few</sup> sporadic attempts to draw <sup>the</sup> freshmen into a battle. I possess a blue-beech walking-stick, or rather bludgeon, as thick as your wrist, which was picked up on the knoll east of the Main Building (near where the two cannon now are) in the autumn of 1891, after a skirmish between freshmen and some senior students.



As I have already remarked, the Literary and Scientific Society drew its members from all years and all courses, and it provided for various <sup>student</sup> activities. It was managed by a General Committee which was elected each spring, to hold office during the following session. Entering the University in October 1887, the first elections I became involved in were held on March 23, 1888.

These elections were a notable feature of student life. I suppose, in a democratic institution like the University of Toronto, one might expect vigorous contests between opposing factions. Certainly there were such occasions and there seldom failed to be a lively time. The organization into 'parties' in the big student body as a whole originated, I believe, in the natural division between those students who lived in the Residence and those who boarded in the City,--the Inside Party and the Outside Party. In Dominion and Provincial politics there was usually little difference between the 'platforms' of the two Parties, but there was less in the case of the student parties. Of course each tried to pick good candidates for the various offices, and, having chosen the men, they fought vigorously to elect them.

In the early days the Insiders were the more numerous, but as the attendance at the University increased, the Outsiders became the larger body, and in the '80's they far outnumbered the Insiders. But the latter pulled together and were always ready for the fray. Also, there were many from the City who had kind feelings for the Residenters and joined with them to even-up the fight. Actually, the old names, Inside and Outside, were mostly discarded, and new ones were adopted to suit the occasion.

In March 1888 the initiative appears to have been taken by a number of Insiders who had a meeting, laid down a platform and called themselves the Red Party. They issued a comparatively brief manifesto which was signed by twenty-five students. This I consider a historic document and it is given below.



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LITERARY AND SCIENTIFIC SOCIETY ELECTIONS

THE RED PARTY

Since the scheme of building a University Club and Gymnasium Building has been successfully inaugurated by the hearty and unanimous co-operation of the undergraduates of Toronto University, and has therefore vanished from the arena of party politics, the attention of the members of the Society is invited to other questions of interest and importance.

The party which is hereby designated the Red party, respectfully asks the members of the Society to endorse the following policy:

1. To harmonize the various elements of student life, and to cultivate a true University spirit.
2. To aid in every way the establishment of a University club and Gymnasium Building.
3. To bring about greater economy in the management of the affairs of the Society.
4. The reduction of fees.
5. The appointment of a Graduate Critic.
6. Frequent open and public debates.
7. To accord to the graduates the full privileges of membership.
8. To give the members of the Society who are students in the faculty of medicine, representation on the General Committee, if they evince a desire to take an active part in the affairs of the Society.

Signed on behalf of the party:

G. Boyd  
J. W. McMillan  
W. Prendergast  
W. E. Burritt  
J. G. Harkness  
T. M. Higgins  
A. A. McDonald  
W. E. Woodruff

L. Boyd  
W. O. McTaggart  
G. F. Peterson  
W. F. Bald  
G. A. H. Fraser  
F. C. Snider.  
D. N. Buchanan  
R. J. Gibson

A. Smith  
J. R. Sinclair  
G. A. Harcourt  
R. W. Carroll  
U. M. Wilson  
G. Hammil  
G. A. M. Young  
D. W. McGee



Very shortly afterwards another printed statement was circulated. It was signed by ten students and protested against the division into parties and the nomination of partisan candidates when the choice should be solely on merit. That document follows:

ANNUAL ELECTIONS OF THE LITERARY SOCIETY

March, 1888

Palman qui meruit, ferat

The Members of the Literary and Scientific Society.

Gentlemen,--We think the Literary Society should be true to the purpose of its origin; and that in fulfilling any other function--such as instruction in political management and opposition--it goes beyond its proper sphere, and, in just so much, leaves behind the objects of its origin; therefore we cannot favour party elections without some practical benefit in view for the Society, only to be achieved by organization, i.e., party elections.

We believe that, with few exceptions, only frequent attendance at the Society can give either the right or the information necessary for a proper use of its franchise. We believe that through party elections much valuable interest is expended for the sole purpose of procuring voters neither deserving of the franchise, nor wise in its use. If there be established a society for literature and public speaking only, we do not believe that the students of University College will fail to supply either the interest or the money necessary for its maintenance.

We believe that the Society's officers should be elected on account of merit, as the best from the Society as a whole, and not as the choice from a part only.

And it is for these reasons that we desire to declare ourselves unrestricted by any pledges whatsoever, in our voting at the Literary Society's elections: We shall form no party; we shall oppose no party; we remain at perfect liberty to vote for the nominees of any party, or



or any indepen<sup>der</sup>t member, solely as the merits of the candidates shall seem to each of us, individually, to decide. And we would most respectfully submit this plan of action to the consideration of our fellow-students, as the fairest and the wisest both for the awarding of offices, and for the advancement of our Society.

In abiding by these principles, we trust to see the deserving nominees neither of a party, nor of an individual member, defeated by the organized vote of their fellow-students; we trust that the officers of the year will be the representatives of merit, and not of a union artificial and unprofitable, a result, the bringing about of which ceases now to be our care, and becomes alike the duty and the privilege of every true member of the Literary Society of University College.

F. J. Steen,  
W. A. Bradley  
H. C. Boulton  
T. C. Des Barres

(?) P.  
R. McL. Forin  
W. H. Grant  
F. C. Armstrong

J. D. Spence  
H. J. Cody  
G. A. Wilson

A few days later a number of 'warriors' from the opposition of the previous year got together to consider the best way to take up the challenge from the other side. The leader in this group was J. A. Sparling, who was president of the Y. M. C. A. He was a wise organizer and added judicious touches to the manifesto which was drawn up and which was signed by twenty-four students. The name chosen was The Affirmative Party, although its members liked to think they were the true successors of the old Outsiders. The manifesto was printed in blue ink and the familiar and historic motto, "Liberté, Égalité et Fraternité," was placed at the top. This document is also given below.

- ELECTIONS -

LITERARY & SCIENTIFIC SOCIETY

Liberté, Égalité et Fraternité

- TO THE -

MEMBERS OF THE LITERARY AND SCIENTIFIC SOCIETY

The Affirmative Party in again presenting to the college electorate a statement of its views, desires first of all to declare itself in full accord with those members of both the old parties and who on Thursday



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last addressed you from a non-party standpoint, in affirming that parties are not always necessary or desirable in the conduct of the Society's Elections.

It is for this reason that its members most strongly condemn the action of the Red Party at the present crisis. There were no questions then before the Society or indicated in the manifesto which could in the smallest degree justify a party contest.

Recognizing this fact, the Affirmative party made no attempt, to revive its old organization, hoping that no party division might take place, and that the officers of the Society might be chosen for merit alone.

That we have been freed from this position--which we held until it was absolutely certain, that the organized efforts of the resurrected Opposition would, unless opposed, result in the placing in office of unrepresentative men,--is no fault of ours. In justice to ourselves and to the great body of non-partisan voters we can no longer remain inactive and allow the Red Party to monopolize all the honours of the year, in opposition to the principle of fair play and the well being of the Literary Society.

We are further agreed with the men above referred to, in affirming the principle of liberty of thought and independence of action on the part of every voter. The Affirmative Party neither claims nor can claim jurisdiction over the private opinions of its members; certainly it has never required its members to vote contrary to their conscientious convictions. It is an organization for the promulgation and defence of principles.

In pursuance of its progressive policy in the past, the members of the Affirmative Party desire to <sup>C</sup>weld together in the <sup>C</sup>losest possible manner all classes and interests in cordial support of the scheme for a College Club, which they last year so heartily and successfully advocated,



and which now requires the earnest co-operation of the under<sup>graduates</sup> to become a success. Since that time, as the result of the creation of the Medical Faculty, a new element has entered the arena of college life. For our fellow under<sup>graduates</sup> of the faculty we deem it in the interest of the society to provide adequate representation on the general committee. Without such representation, through which the names of our new members may be made known to the programme committee, we cannot expect them to take an active part in the proceedings of our society.

We heartily approve of the action of the retiring General Committee in securing the active co-operation of the first year in the proceedings of the society. The Affirmative Party would strongly impress on its candidates, the necessity of continuing this wise policy and of urging all members, regardless of class, faculty or academic standing, to hearty union for the furtherance of the interests and objects of the society.

The Affirmative Party therefore while re-affirming, in its full force and vigor, the principles for which it fought last year, stands forth now as the advocate of justice to all, as the exponent of the policy, which, at its inception, controlled it--the union of the action which characterizes a party with the greatest freedom of thought on the part of the individual.

|                           |                |                  |                |
|---------------------------|----------------|------------------|----------------|
| <sup>a</sup><br>Black, W. | Fenton, W.J.   | Heggie, R.E.     | Mustard, J.A.  |
| Coutts, R.D.              | Ferguson, G.H. | Henderson, J.W.  | Robinson, G.W. |
| Dales, J.N.               | French, F. W.  | Marani, C        | Sawyer, F.L.   |
| Donald J.A.               | Giffen, J.A.   | McIlwraith, K.C. | Shore, H.W.C.  |
| Downes, G.F.              | Godfrey, J.M.  | McKinnon, A.J.   | Walker, D.     |
| Edgar, J.W.               | Graham, W.H.   | McClellan, G.B.  | Witton, J.G.   |

Caucuses of the two parties chose their candidates, which included representatives from Medicine and from Practical Science, and cards were printed giving the two 'tickets', the ink used being red for one, blue for the other. Also, specimen ballots were printed showing where to mark the X's. Mass meetings were held to discuss the platforms of the two parties and some of the best speakers went over to the Medical School near the General Hospital, then on Gerrard Street East, to enlighten the men there.



The expenses were considerable and the members of each party made contributions to meet them. If a candidate was able, he gave a larger amount. Most of the fellows were willing to 'chip in', but few liked to see the funds handed out in a too-lavish style. All students were considered members of the Society, but a person could not vote unless his fees of \$1.50 for the session had been paid. Now there were many who had been negligent in this matter, especially in the Medical Faculty, who found it inconvenient to attend the meetings; but in a close contest the managers of a party would hire cabs and send men to bring some of these absenting students to the polling booth and would pay their fees in order to secure their votes. At some elections this had reached the proportion of a scandal, but in March 1888 such a 'corruption fund' was of small dimensions.

There was another feature of these contests. Each party organized a "Brute-force Committee" of four or five sturdy athletic persons whose business it was to prevent any one on the opposite side from voting. For an hour at a time this 'committee' would assist members of its own party to pass through the narrow entrance, one at a time, and prevent the other side from getting near it. However one side would usually become weary of holding the fort, and their opponents, with a mighty effort, would push them aside and take their places. Pretty rough house much of the time!

The voting commenced in early evening and continued until an interval of ten minutes had elapsed since the last vote was cast, and then the presiding officer declared the poll closed. This usually occurred about 2.30 a.m. At once the counting of the ballots began, scrutineers for the two parties carefully checking the number of votes for each candidate.

In this election there were about 350 votes cast and of the fourteen candidates supported by the Affirmative Party all were elected except one and he lost out by four votes. The Party was jubilant at the result.

But what they fought each other for  
I could not well make out.  
But everybody said, quoth he,  
That 'twas a famous victory.



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Southey's poem, "The Battle of Blenheim", was included in the Third Book of the series of Readers introduced into the Public Schools of Ontario in 1884 (see page....) but for the word "killed", which occurs twice in the original, the word "fought" was substituted. My attention was directed to this unwarranted alteration by D. K. Preston, one of my trustees.

This election was the last to be held in Moss Hall, which originally had been a part of the building accommodating the medical faculty of King's College (1843-53), and was being torn down to make way for the western section of the Biological Building, about to be erected largely for the new Medical Faculty which had been established in 1887. For some years <sup>after this</sup> the Society met in the College Y.M.C.A., which was very convenient for the purpose but was not available for an election contest.

In the autumn J. R. Wells, a student in Mathematics and Physics, who had been elected Third Year Councillor, failed to return for the session, and at the meeting of the Society on November 3, 1888, I was chosen in his place. Thus I came a member of the General Committee for the session 1888-89. During our tenure of office of course we sat for a group photograph, which I got framed and still possess. Forty-four years later, on September 10, 1932, the corner stone of the David Dunlap Observatory was laid, and on the improvised platform there sat three persons who appear in that photograph: G. Howard Ferguson, Premier and Minister of Education for Ontario; H. J. Cody, President of the University; and myself. Dr. Cody, who was chairman for the occasion, referred to this photograph during the ceremony and the newspapers reproduced pictures of the persons.

The spring of 1889 brought out another Literary Society election. The persons with whom I was associated called themselves The Party of Progress and I really do not remember the name of our opponents. But when the result of the voting on March 22 was announced we found we had been disastrously defeated. I have always thought the 'superior' name we chose had much to do with our defeat. Better a name with no special connotation, in a student democracy--perhaps in a country-wide one, as well.



The election this time was held in the St. Vincent de Paul Hall which I believe was on Wilton Avenue (now Dundas Street West) near Yonge St., and was rented for the purpose. Being on the General Committee, I helped to 'run the show' and was around the Hall all night. When the voting was ended and the ballots had been counted we left for home,--about six in the morning. The treasurer, 'Bob' Heggie, and I walked up Yonge Street and he carried a pasteboard box. It had contained a cake which, with other food, had been delivered to the polling place, as refreshments for the officers on duty. It was now filled with paper money, mostly in small bills, the proceeds of the fees paid the night <sup>just passed.</sup> before. Heggie said there was five hundred dollars in the box, which he continually tossed up in the air and caught when it came down.

There was another Literary Society election <sup>while</sup> which I was a student, namely in March 1890. On this occasion the contest was held in St. Andrew's Hall, out Queen Street West. A carpenter was employed to strengthen some parts of the building, to prevent any damage being done to it. The only special features of the evening which I remember were the sturdy athletic committee on our side, and the presence in the hall of a street-piano, the Italian owner of which had been given a couple of dollars to play it during the voting.

Why such contests? The only reason given which approached sanity was a very realistic one, namely, to get funds to carry on the work of the Society. The students regularly neglected to pay their fees, but rallied to the trial of strength, and incidentally to pay their dues.

Third Year in Mathematics and Physics

The work in the third year of the course in Mathematics and Physics differed somewhat from that in the first two years. In the latter the subjects were in pure mathematics, such as: Algebra, Geometry, Trigonometry, Analytical Geometry, Calculus, Theory of Equations; in the former the subjects were in Mathematical physics, such as: Analytical Statics, Dynamics of a Particle, Dynamics of a Rigid Body, Geometrical Optics. In these subjects the mathematics we had studied was applied to the solution of problems in physics. Besides this, the students were required to perform many practical experiments in the Physical Laboratory,



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chiefly in verification of the laws of mechanics, heat, light, sound and electricity as enunciated in our text-books.

Our instructors were the well-known James Loudon, who graduated B.A. in 1862, and who became President of the University, 1892-1905, in succession to Sir Daniel Wilson; his nephew, William J. Loudon, B.A. 1880; and J. G. Witton, B.A. 1888, Fellow in Physics for the session.

Besides the stiff mathematical subjects in each year, there were elementary courses in physics, which were taken also by students in other graduating courses. They were illustrated by practical experiments, sometimes quite spectacular. Perhaps I may refer to the course in Elementary Mechanics and Hydrostatics, which was presented by James Loudon. This dealt with velocity, acceleration, mass, force, hydrostatic pressure, etc., pretty abstract ideas and demanding considerable thought. Professor Loudon was very competent, but quiet and sober in his demeanor. In one lecture he was illustrating the pressure of the atmosphere by means of the familiar Magdeburg hemispheres. Two brass hemispherical shells, each with a handle on it, are carefully made to fit together to form a hollow sphere from which the air is then exhausted by an air pump. If the air is removed from the inside of the sphere, the atmosphere pressing on the outside surface should hold the hemispheres together. The hollow sphere was attached to the big Bianchi air pump which was then vigorously worked by the assistant for a minute or two. Then the sphere was disconnected from the pump, and two students in the front row were asked to take hold of the handles and try to pull the hemispheres apart. This they did and tugged away for some time, amid much advice from the rest of the class. At last they came apart with a mild 'bang', and a loud cheer and great applause filled the room. Professor Loudon smiled broadly, almost laughed aloud! It was said this was the only time he smiled during the course. It made one think of the White Ship which in 1120 carried the heir to the throne to his death; and his father, King Henry I, "never smiled again".



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There were some changes in the membership of our class. Several had fallen by the way. One of these, Campbell of Glengarry, the biggest and sturdiest of us all, who had acted as 'anchor' in the tug-of-war of the field sports, never came back, but died of tuberculosis a year or two later. But we had a gain also. On the Second Examination in May 1887, the first place in Mathematics and Physics was captured by H. R. Moore, <sup>then</sup> He dropped out for a year, but now had come back and was taking the work of the third year along with us.

The work of the session 1888-89 went on smoothly, as usual. Some parts of it were difficult enough, but those who framed the course intended that it should require serious and continued effort on the part of the student who is endeavouring to secure honours in it. No laggard should enter!

The results of the May Examinations were duly announced and the list read as follows:

Class I. 1. A. T. DeLury, 2. H.R. Moore, 3. C.A. Chant, 4. F.L. Sawyer;  
5. W. F. Seymour, 6. T. H. Whitelaw.

Class II. 1. D. A. Burgess, 2. Miss G. Lawler.

For honours in English there was required an intensive study of selections from Milton, Dryden, Shakespeare (King Lear), and Spenser; together with a further study of the history of the English Language.

The examination list read:

Class I. 1. Miss L. L. Ryckman, 2. D. A. Burgess, <sup>and</sup> C. A. Chant. (~~aeq.~~)

Class II. 1. Miss J. Stork, 2. F. J. Davidson, D.H. McLean (~~aeq.~~), 4. Miss G. Lawler, A. A. Macdonald (~~aeq.~~), 6. W. R. Rutherford, Miss A. Willson (~~aeq.~~), 8. H. A. Dwyer, 9. W. C. P. Bremner, 10. Miss C. A. Moss, A.H. Sinclair, <sup>(aeq.)</sup> 12. Miss M. A. Cameron.

Below line, W. H. Graham.

#### Pilgrimage to the Country

It was now time for a change of scene. During the session just ended Whitelaw and I roomed together on Yorkville Avenue, and our class-mate DeLury had suggested that, after our last examination paper, we should walk to his home at Manilla, some 57 miles north of Toronto, or 37 miles beyond my home



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in Unionville. He and Wilton would do the same, leaving the day before us. It turned out to be quite an expedition.

Whitelaw and I took the afternoon train out to Unionville, stayed over night there and next morning started walking northward on the railway. We passed several small stations, were ordered off the track by a section foreman, but got back again as it was the only road we knew, and reached the town of Uxbridge, <sup>21</sup>~~21~~ miles, and began to feel tired. Also a cold drizzle started to fall. We took shelter under a section-men's tool-house, but the weather did not improve. So we doggedly pushed ahead and at about 5.30 reached Blackwater Junction, where my brother was station agent. We had trudged 31 miles, my longest walk on any of my days, <sup>and</sup> still six miles from our destination. Dry clothes, a crackling fire and something to eat gave a new aspect to life, but we did not achieve honours as pedestrians. In the morning my brother improvised transportation. He clamped a board about two feet long to the 'pillion' behind the driver's seat of his "jigger" (a railway velocipede with two main wheels on one rail and a small guide-wheel on the other); and while his two passengers sat side by side on the board, leaning neither to right nor to left, he pedalled us to Manilla, six miles away. Our partners in the escapade reached Stouffville, 29 miles, on their first day and Manilla on the next. There was a pleasant re-union, a jolly time. The following day we started homeward,--but we did not walk.

#### Fourth Year of the M. & P. Course

In the final year of the course the student was allowed two options, (1) Pure Mathematics, or (2) Physics. The latter was more to my taste and I chose it. The subjects were:--Elementary Sound, Elementary Electricity and Magnetism, which did not involve any advanced mathematics; and the harder ones:--Elasticity, Hydrodynamics, Acoustics, Physical Optics, Thermodynamics, Electricity, Least Squares. In addition to this theoretical work there were many hours of practical experimenting in the Physical Laboratory.

Some of these subjects were more attractive to me than others. The lectures and demonstrations in Elementary Electricity were about equivalent to the instruction in that subject given in a good high school twenty-five years later.



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By the year 1890 direct-current electricity and Ohm's Law were well understood and the electric telegraph was widely used. The Atlantic Cable was in successful operation and the story of its laying, and its value to commerce and to the patrolling of the oceans, inspired the young and the old. But the telephone was a rarity. The first really successful instrument was shown by Bell at the Centennial Exhibition in 1876, and many problems in engineering had to be solved before it was <sup>in a form</sup> suitable for installation in the office and the home. The electric generator and the electric motor were almost unknown. The principle of electromagnetic induction was actually discovered by Faraday in 1831, but its development had been slow, and the utilization of the alternating current in industry <sup>and in our houses</sup> was yet to come. The first "dynamo" which I saw in operation was being used to illuminate by arc lights the amusement grounds at Hanlan's Point on the Toronto Island about 1889. It was a Thomson-Houston machine in which the armature had a spherical form. It has been my privilege to see the subject of Electricity so studied and so applied that it has completely revolutionized the manner of our lives.

The mathematical treatment of electricity which we had in our courses was Electrostatics as given in the famous old textbook known as Thomson and Tait's "Natural Philosophy". In Elasticity and in Hydrodynamics we seemed to use ponderous mathematical machines to attack problems not exactly suited to them, with the result that we did not make much progress in this difficult field. For Thermodynamics the text-book was Clausius' "Theory of Heat", and I laboured hard to master it; but it seemed elusive and I never felt too certain in applying it to practical <sup>problems</sup> machines. The text-book on Physical Optics was in French and I began the study of that language in order to read the book. The wave-theory of light and the existence of the luminiferous ether strongly attracted me, and new discoveries in <sup>after</sup> <sup>further</sup> later years impressed upon me the actual presence of waves and rhythms in every part of the physical universe. It is a wonderful thought!



I feel I should say something about my study of Sound. My interest in the subject had been aroused by reading a book entitled "Natural Philosophy, Popularly Explained" by Samuel Haughton, which was presented to me in 1882 by a friend who had used it at Victoria University at Cobourg. As a text-book on elementary physics it was not very thrilling, containing no showy experiments or fine pictures as seen in such works in later years, but the principles were clearly stated. The part dealing with Sound was the most interesting to me. The University possessed a very fine collection of acoustical apparatus. It had been displayed at the Centennial Exhibition by its maker, Rudolph Koenig of Paris, and it was secured for the University by James Loudon, who knew how to make use of it.

If one hears a musical sound and traces it to its source one finds that it was produced by the vibrations of a material body. These vibrations set up waves in the surrounding atmosphere which travel to the ear and produce the sensation of sound. One of the characteristics of a musical note is its pitch. This depends on the frequency, or the number of vibrations per second, of the source of the sound--a high pitch coming from a high frequency of the vibrating body, and a low pitch from a low frequency. This fact could be illustrated practically by means of the apparatus at the University. The human ear can detect musical sounds having frequencies from about 30 to about 10,000 per second,--differing in the individual. We have heard much about super-sonics in later years; these are vibrations in a material body of higher frequency than can be detected by the ear. All this is wonderful--a sensation, <sup>which is</sup> something in the mind or <sup>in</sup> the <sup>non-</sup>material portion of <sup>when one thinks of it--</sup>ourselves, is produced by vibrations in an external body.

Next, let us consider two violinists with identical violins. Let A play continually a single note while B plays various notes, of higher and of lower pitch. Usually there will be discord between the notes from the two violins, but at times there will be harmony--a "concord of sweet sounds". Some of these concords will be more pleasing than others.



Now if the frequencies of the notes in these concords are measured we find that the most perfect harmony occurs when the frequency of the higher-pitch note is just twice that of the other. At that time one note coalesces with the other. We say that the interval between them is  $\frac{2}{1}$ . <sup>A man's</sup> Man's voice will harmonize perfectly with a woman's voice in singing a simple air when there is an interval of  $\frac{2}{1}$  between them, the pitch of the woman's voice being the higher. If we produce a series of notes having frequencies proportional to the simple numbers,

$$1, 2, 4, 8, 16, \frac{32}{2}, \dots$$

the interval between each note and its successor being  $\frac{2}{1}$ , they harmonize perfectly and if all are sounded together they combine into a grand harmony. Such a series of notes is the Harmonic Scale.

This has been known for ages; and during the past centuries musical<sup>ly</sup>-gifted persons have been able to interpolate between notes 1 and 2, or 2 and 4, etc., a series of notes which seem to pass from the first to the last (1 to 2) by a series of steps peculiarly pleasing to the ear, and the frequencies of these notes are proportional to

$$1, \frac{9}{8}, \frac{5}{4}, \frac{4}{3}, \frac{3}{2}, \frac{5}{3}, \frac{15}{8}, 2,$$

which we represent by

$$c, d, e, f, g, a, b, c'$$

The whole eight notes are called the Diatonic Scale and the end notes c and c' are said to be an octave apart. The most pleasing interval is that between c and c', which is  $\frac{2}{1}$ . The interval from c to g, or  $\frac{3}{2}$ ; and from c to e, or  $\frac{5}{4}$ ; follow next as pleasing sequences, and it will be observed that in expressing them numerically we use only the simplest numbers

$$1, 2, 3, 4, 5.$$

What I am trying to make out is that the most pleasing intervals are expressed by the smallest numbers. I think this is a remarkable fact. Why should our most pleasurable sensations of sounds be so closely related to the simplest numbers? It is one of nature's mysteries.

(Refer to page 2)



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The above is the barest outline of this phenomenon of musical intervals. I verified the facts by means of the wonderful set of tuning-forks in the Acoustical Laboratory. Musical scales are certainly built on mathematical principles. [Joan]

I ~~am~~ express here the pleasure I had in attending receptions given by President Wilson on March 3, 1888, at 121 St. George St. when in my second year, and on November 24, 1888, at 46 St. George Street, when in my third year. Mrs. Loudon entertained the students in Mathematics and Physics on February 9, 1889, from 8 o'clock p.m., at her home, 133 St. George St. This was in my third year, and we all considered it a privilege. The invitation is before me as I write. It is in that angular hand so familiar sixty years ago.

#### THE UNIVERSITY CONVERSAZIONE; THE GREAT FIRE

The greatest treat during the session was to attend the Conversatione, perhaps in the company of a lady friend. It was the big social function of the year. To it the University could invite the people of Toronto, and entertain them with the best of music and with exhibits of a scientific and literary nature. The public debates in Convocation Hall were good and were attended by large numbers from the City, but they smacked somewhat of an academic exercise, while the Conversatione was equal to half-a-dozen high-class 'shows' in progress at the same time.

It was held about the middle of February. The General Committee of the Literary Society met early in January and appointed the conveners of the various Conversatione Committees. For the affair of February 15, 1889, they were: Music, R. J. Gibson; Invitations, E. G. Rykert, R. Palmer; Natural Science Display, J. J. Mackenzie, B.A.; Reception, J. H. Senkler; Decoration, J. H. Rodd; Finance, R. E. Hoggie; Printing, H. J. Cody; Refreshments, J. S. Johnston; Physical Experiments, J. Gill; Engineering Display, H. E. T. Haultain, Dressing Rooms, C. H. P. Owen; Lighting and Seating, H. B. Fraser.



12.4

This is a formidable list, but the committees had great responsibility in preparing for the <sup>12.4</sup>gib occasion. The Main Building was well suited for academic instruction in the day-time but not for social events in the evening. If I remember correctly, the only artificial lighting consisted of a few ~~unlit~~ naked gas-jets in the main corridors, with ordinary gas-illumination in the Senate Chamber and in Convocation Hall. A contract had to be made with a city firm to supply an abundance of oil lamps properly placed and ready for use. Similary with seating accommodation and decorations all over the place.

The Programme contained eight pages,  $4\frac{1}{2}$  by  $5\frac{1}{2}$  inches. The outer pages had a lithographed view of the south front of University College, of its coat of arms, and also various symbolic sketches of literature and science. On page two was the list of Officers of the Society for 1888-89. On page three, <sup>was</sup> the programme of music by the Band of the Q. O. R. in the Main Lobby during the evening, while the Hungarian Gipsy Band played in the Museum on the second floor. (This Band was a novel organization which gave frequent concerts in what was intended to be a 'permanent exhibition' on Front St. West)

On pages four and five was the programme for the Main Concert in Convocation Hall, which was in two parts. The first part began at 7.45 and at its close the audience left the Hall to make way for those who could not be accommodated for the first part. The University Glee Club were down for four selections; noted vocalists were:—Miss Maggie Campbell, Mrs. F. R. Mackclean, and J. Bryce Mundie; violin solos were rendered by Mons. F. Boucher; and Miss Nora Coleman gave two readings, "Aux Italiens" (Lytton) and "The Chariot Race" from Ben-Hur (Wallace). The Musical Director was E. W. Schuch, who trained the Glee Club; and the accompanists were Mme. Boucher, A. S. Vogt and G. H. Fairclough.

On page six is a list of the Places of Interest:—Armory of K. Company, Q. O. R.; in Senate Chamber, Microscopic preparations and Spectroscopes; Display of Civil Engineering Department; Library and Museum, Sir Daniel Wilson's Archaeological Collection; in West Lecture Room, Views by "Grip" and various experiments in Optics; in Physical Laboratories, Experiments in Sound and Electricity, all



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evening; the Literary Society's Reading Room; and by no means the least attractive, Refreshments all the evening in Lecture Rooms No. 3 and No. 7.

On page seven was the list of Conveners of the Conversazione Committees, which I have already given.

The price of the tickets was \$3.00 for a set of four, suggesting that a person might buy a set and take three of his city friends with him to the entertainment. But hiring a cab for the party and perhaps adding flowers for the ladies made this beyond the means of the ordinary student, who, however, could purchase a couple of tickets, or even a single one for himself. Whichever way one went, it was a grand evening and the big building was crowded.

The months passed and the date chosen for the next Conversatione was Friday February 14, 1890, St. Valentine's Day. The committees did their duty and the programmes were printed. (I was on the printing committee). Up in the Senate Chamber was a display in Bacteriology, which included the "La Grippe" microbe. <sup>in fact</sup> (Was it?) Being in my final year I was asked to take part in the display arranged by the Mathematical and Physical Society, and my chum Whitelaw and I had spent many hours preparing the experiments in sound which we were to show to the visitors. We actually continued working <sup>on our exhibits</sup> until six O'clock, when we left for our boardinghouse on Gloucester St. Hurriedly we took supper and dressed and started back for the University, carrying our gowns on our arms. When hastening along St. Joseph St., <sup>about</sup> to cross over Queen's Park, a man called to us that the University was on fire! We ran all the faster, and there, through the leafless trees, we saw the beautiful building burning fiercely!

We learned that soon after we had left, two attendants were carrying up the stairs at the south-east corner of the building a tray holding several lighted oil-lamps which were to illuminate the microscopes in the Senate Chamber, when one man slipped on the polished steps, the tray was tilted, and one of the lamps fell off and rolled down the stairs. It broke, the oil took fire, and the blaze could not be extinguished.



We went into the building by the door under the lovely colonnade at the west end, and assisted in removing the apparatus to near-by houses on St. George St. As a matter of fact it was very slightly injured as this <sup>west</sup> part of the building was not burned.

Firemen came from all parts of the city and connected the hose to all the hydrants in the neighbourhood. However the entire east wing, including Convocation Hall, and also the south front as far west as the central tower, were destroyed. This portion included the Library which was on the second story. In it were some rare and valuable works as well as the ordinary books to be found in a college library, but all were lost except a few <sup>which</sup> ~~that~~ happened to be out on loan at this time. The Museum was on the same floor as the Library but west of the Main Tower. Most of the objects in it were saved, and were afterwards put on display in the Biological Building. The roof of the Museum was burned and the water was inches deep on ~~the~~ <sup>its</sup> floor, and ~~the~~ <sup>its</sup> walls were injured but not destroyed. The lecture rooms on the ground floor below the Museum were not seriously injured, and the physics laboratories in the west end, as well as the entire west wing containing the students' Residence escaped completely. The interior of the Main Tower was mostly of wood which burned with a fierce heat, and the bell, which used to be rung at the hour, fell to the ground and was melted. Afterwards I was fortunate enough to secure some fragments of ~~it~~ <sup>this bell</sup> which I had made into a model of the bell, <sup>also</sup> ~~ostensibly~~ <sup>also</sup> for an ink-bottle, and into souvenir paper-weights.

Great quantities of water were poured on the flames until the lawn in front of the Building was covered with water some inches deep, <sup>much</sup> as when a strong spring sun beats down upon the lingering snow throughout the day and fills the hollows of the frozen ground. We waited and watched ~~#~~ until about eleven o'clock, when the flames had been subdued, and then went home.

Deep regret was felt by University of Toronto graduates all over the world when they learned that the beautiful building in which they had spent their undergraduate days had been destroyed by fire. But the outer walls were still standing and the foundations were still solid, and it was decided to restore



the building to its former outer appearance but to adapt the interior to the conditions prevailing at the time.

The insurance on the building was \$90,000. The total amount required to restore it was estimated at \$250,000, and the Ontario Legislature voted \$160,000 to make up the necessary funds.

Lectures were resumed the next week, in various buildings, whenever rooms were available;--especially in the Biological Building, the School of Science and the College Y.M.C.A. The great disaster was not allowed to interfere unduly with the work of instruction.

### The Final Examinations

The session soon came to an end, with the inevitable examinations in May. Although I had attended the lectures in English during the year--and I remember <sup>especially</sup> practically the course in seventeenth-century English Literature given by W. J. Alexander in this his first year as Professor of English in the University--yet I did not write on the examinations in that department. I thought it wise to devote more attention to Physics, which was my main subject study.

The results of the examinations in Mathematics and in Physics were published as follows, the candidates being arranged alphabetically:--

Mathematics: Class I, A. T. DeJury, F. L. Sawyer. Class II, Miss G. Lawler.

Physics (Theoretical): Class I, C. A. Chant, H. R. Moore, W. F. Seymour, T. H. Whitelaw. Class II, D. A. Burgess.

Physics (Practical): Class I, Burgess, Chant, Moore, Seymour, Whitelaw.

### Graduation Dinner of The Class of 1890

The Graduation Dinner of the Class of 1890 was on the evening of Monday, June 9, at Harry Webb's Restaurant, which was located on the west side of Yonge Street, just south of King Street. There was only a moderate attendance, for various reasons;--some are indifferent about Class relations, some could not easily afford it, some had adequate excuses, but it was partly in protest that the committee did not invite the ladies. That important question had not been finally settled in 1890.

I remember that one of the 'dishes' on the menu was "golden plover" and the tiny carcasses caused <sup>merry facetious</sup> merry facetious remarks.



Perhaps the outstanding feature of the evening was the poem read by H. A. Dwyer, the Class Poet, entitled "Leaving Port", which was as follows:

LEAVING PORT

Class of '90

Four years in the haven the ship has been fitting,  
Now the voyage-time comes and the anchor is weighed;  
Though the harbor's been snug, yet the time comes for flitting,  
And we sail out of port, all our colors displayed.  
Farewell! old times. Good-bye! old faces,  
The time has come to say good-bye.  
We sail away gladly, we're searching for treasure,  
But the length of our voyage not one of us knows,  
And we cannot sail back to the old port of pleasure,  
There's no sea in the world where such magic wind blows.  
And so we'll mingle a little sadness  
Even with the hope of happy days.  
They give us our orders now; Go! the world calls you,  
Active service you've waited for, now it is here,  
And there's no drawing back. On! whatever befalls you,  
You've no room on board ship for dishonour or fear.  
Ay, ay! we all answer, then shout to the helmsman;  
Firm hand on the rudder there, steer us right onward!

*The poem* It evoked the remark by J. J. Ferguson that "Some are Leaving Port and some are leaving no port,"—although it must be said there were no wines on the menu. However we were all sufficiently solemn when saying farewell.

Commencement Day

Commencement was on Tuesday, June 10. As Convocation Hall had been destroyed the students petitioned the University Senate to have the annual Commencement exercises in a tent on the lawn in front of University College, and this was granted. The afternoon was showery, but the students and their relatives and friends filled the large marquee. My father and mother came to see their youngest son receive the B.A. degree.



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Ordinarily the Vice-Chancellor gave the Commencement address. But there had been some criticism of Vice-Chancellor William Mulock for his extra-ardent support of the newly established Faculty of Medicine and for his somewhat concealed efforts in the construction of the west portion of the Biological Department, actions <sup>however</sup> which certainly led to distinction for the University of Toronto in later years. Further, the outstanding statesman, Edward Blake, B.A. 1854, had recently been re-elected Chancellor, and the great fire had moved him to take a very active interest in the affairs of the University. So he gave the annual address. After discussing the condition of the University and presenting statistics to show its growth and needs, he said:

And now I turn to that sad event which has left us homeless and which obliges us to meet to-day on a grassy floor, under a canvas roof, hard by those walls, "all roofless and storm-broken," which were at once our shelter and our pride. In a few short hours the stately pile we loved so much, round which so many pleasant memories cling, the principal home and seat of learning in the Dominion, the chief glory of this city, was left the ruin we deplore.

*Alphabetical Standing: the Awarding of Medals.*

Convocation List, 1890. I think I should place on record some reference to the bestowal of medals in 1890. It was customary to offer a medal on graduation in each of the honour courses and to announce the winners on the programme for the autumn Convocation. The first item on the list for 1890 was:

THE STANLEY MEDAL

The gift of His Excellency, Lord Stanley of Preston

Physics.....Not awarded

In the Toronto Mail for October 3 appeared a short letter signed "Enquirer" asking why there was no medal awarded at the recent Convocation in the department of Physics <sup>in spite of the fact that the class is recognized to be an</sup> "in unusually strong one." I have no knowledge of the writer of this letter. In The Varsity there was some discussion about the awarding of a medal when the candidates ~~who would~~ are arranged alphabetically, and the



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editor asked, "To whom would the medal be given if half a dozen or more were fortunate enough to take first-class honours?" Under date October 16, I wrote from Ottawa and drew attention to what had just happened in the department of Physics.

In the latter part of August 1890, I wrote to the Registrar inquiring if a medal would be given in Physics. He replied that there would not likely be an award. He continued:

No recommendation has been made, it being practically impossible to discover who is the best man. Of course you understand that first-class men in the fourth year examination are all considered equal.

The medal in Physics has been withdrawn for next year.

I then wrote to Prof. A. C. McKay, the senior examiner in Physics in 1890, who promptly replied:

No recommendation was made this year, because none was asked for-- as was done in the past.

On the advice of several friends, I petitioned the Senate. I argued that in this case the class-equality regulation and the offer in the Calendar were contradictory in nature and I contended that the offer in the Calendar should be carried out. My petition was presented at the meeting <sup>of Senate</sup> on Hallowe'en, and a few days later I received a card saying that the Senate had no jurisdiction in the matter. When I sent in my petition, I also wrote to Professor Loudon, acquainting him with what I had done, and when he saw I had petitioned the Senate he wrote informing me that the College Council was the proper authority. *Said he:*

I think you are taking the proper course in view of the offer made by the Council in their Calendar. They cannot plead that I made no recommendation, because I never have done so in previous years. The point is, if they gave the medal in previous years on the advice of the University Examiners, why did they not do so this year?

Professor McKay also thought I was taking the proper course in demanding



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a definite reason.

I then wrote to the Registrar asking how I should approach the Council, and when they met. In reply he said he would state the reasons why there was no award, and he gave them as follows:

The medals are at the disposal of the College Council, and in other departments where medals were given the recommendation of the professor was taken as the sole ground of the award. No reference to the relative standing of candidates at the Exams. is possible beyond the indications of relative merit given by the class lists, where the only distinction is that of class of honours. In the department of Physics there are three candidates besides yourself placed in first class in both divisions of Physics. It is therefore impossible for any one to say which of the four is the best man by the test of the Exam. Professor <sup>Loudon</sup> declined to recommend any one as first on class-work during the session. There is therefore nothing by which the Council may be guided.

Referring to the statement that "the recommendation of the professor was taken as the sole ground of the award," Professor Loudon in conversation informed me that if such were the case he had not been informed of it. He also told me that he was not consulted in the matter. As to the "class-work" of the session, there was no such thing. In some subjects there were no lectures given, and in those lectured upon there was no attempt to mark the candidates.

So I prepared a petition to the College Council in which I requested that body to "determine whether the medal was really won or not; and if it be found that it was, that it be presented to the winner!" After some weeks I was finally informed that all the "communications on the subject were referred to the Professor of the Department, but that no award of the medal has been made." Professor Loudon told me that he was not consulted before and he declined to be consulted now.

A pretty kettle of fish!



But there was another bit of information which I did not bring forth as it was obtained under confidential circumstances. During the last two years of my college course I attended the meetings of the University Senate in order to prepare a report of its proceedings for the daily newspapers, whose representatives were not allowed to be present, and in this way I obtained the freedom of the Registrar's office. Now, when the results of the examinations were being prepared for printing in the Class Lists the reports of the various examiners were freely spread before my eyes and I could hardly avoid seeing them. Thus it was I saw the final results of the class in Physics. The percentage obtained by each of the candidates was given and they were not all equal. After fifty-eight years (1948) I may state that when all the subjects had been added together the highest percentage [was 81, the next was 76.]

*attained was five per cent. above the next below it.*







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VI In The Civil Service

What of the Future? For some years it had been my intention to become a high school teacher, but during my last session at the University another prospect opened before me. The Auditor General at Ottawa, John Lorn McDougall, graduated B.A. from the University of Toronto in 1859 with a gold medal in Mathematics and a silver medal in Modern Languages, and in both departments he afterwards acted as examiner in the University. In 1878 the office of Auditor General was created and Mr. McDougall was appointed to it. Quite naturally he was well-disposed towards honour graduates of the University and he had several of them on his staff. Further, James Loudon, the professor of Physics, who graduated in 1862, married Mr. McDougall's sister. The Auditor General intimated to his brother-in-law that he would like to add a couple more graduates to his staff and the word was passed along to the members of our class. H. R. Moore and I offered to go to Ottawa to enter the Civil Service.

Under date April 17, 1890, the Auditor General wrote to me as follows:

Dear Mr. Chant,

I can employ you for a month and I believe that your employment will be continued thereafter. The pay will be \$2.00 a day.

Under any circumstances should your employment stop, you will get at least three months notice.

Will you come and when?

I don't think that it is necessary for you to make further efforts to obtain political support.

Yours sincerely,

J. L. McDougall.

On the evening of Commencement Day the young woman who later became my wife and I went to see the Cyclorama picture in the round building on Front Street, just west of York Street. <sup>It</sup> ~~In it~~ was a long canvas stretched round the wall and on it was painted a representation of the Battle of Sedan, September 1, 1870. As the visitors moved round the room the circumstances of the battle



were explained by the attendant. We enjoyed the exhibition and incidentally learned something about the Franco-Prussian War of 1870-71.

These Cycloramas were found in Europe as well as America. When I was a student in Leipzig in 1898, I regularly patronized the Panorama Restaurant which was on the ground floor of the Cyclorama building, wherein was a picture of the Battle-of-the-Nations at Leipzig, October 16-19, 1913. The picture in Toronto disappeared many years ago and the building has been used since then for commercial purposes.

Next morning Moore and I took our places in the day coach on the recently completed C.P.R. line for Ottawa. At Smith's Falls we had to change cars and I remember that I left an almost-new pair of rubbers on the other train. At the conductor's suggestion I gave him half a dollar to telegraph for them to be sent to Ottawa, but I never saw them again. I might have saved my money. The Ottawa station was at the western limits of the city and we arrived about 6 p.m.

We were met by I. E. Martin, medallist in Physics in 1886, who was one of our examiners at the University. He took me to a room on Lisgar Street, near Elgin Street, which he had secured for me, alongside that which he himself occupied. Indeed I found that University of Toronto graduates were generally advised to inquire for accommodation in this house, and I stayed there all the time I was in Ottawa. Moore also obtained a room in the house, but when his sister came to Ottawa to study music, he left in order to be with her. I may add that she married J. C. Saunders, the Deputy Minister of Finance, whose signature was on the millions of dollar bills which were being issued. Mr. Saunders' sister, Miss Marshall Saunders, was the author of the famous dog-story "Beautiful Joe."

Next morning we walked along Elgin Street to the Auditor General's office which was in the East Block. He received us cordially and arranged that we should be taken on at once as temporary clerks. He assigned me to assist Mr. Martin and Moore to be with Mr. Gorman, the head of the Revenue Division.



Auditing Accounts. It was Mr. Martin's duty to audit the accounts of the departments of Militia and Defence and of Agriculture. Each year Parliament votes the amount estimated to be necessary to carry on the work of each department during the next fiscal year. The operations of practically every department extend to every part of the Dominion, and for every account paid from Government funds several vouchers must be obtained, together with certificates stating that the expenditure is properly made and that the prices are fair and just. It is very necessary to have all these safeguards against irregularities. Copies of these vouchers are sent to headquarters in Ottawa and checked there, and at the close of the year a complete set of vouchers for each item in the Estimates is forwarded to the Auditor General's office. At least, this was the procedure in 1890 and 1891; I suppose it is still (1948) the same. It was the business of the clerk into whose hands the vouchers for any vote were placed, to examine them in minute detail, to determine if they were properly chargeable against that vote, and to verify all the numerical calculations involved. If any error or irregularity was detected it was reported to the Auditor General, along with the draft of a letter to the department asking for an explanation. If he approved the letter--and he insisted that it must be simple and direct, with no sarcastic remarks--then the letter was typed and he signed it. The department disliked greatly to receive such letters, since they were sometimes printed in the Auditor General's annual report and were eagerly seized upon by members of the Loyal Opposition who were continually on the search for something on which to base criticism of the Government.

After this careful auditing had been completed the vouchers for any particular vote would be re-arranged so that expenditure for any special thing, along with the name of the persons receiving the money, would be combined together and the whole put in suitable form for printing. Then the various items were added together, and the total, of course, had to agree with that obtained on adding all the individual vouchers.

The latter part of this work looks rather mechanical, not requiring much thought, but often considerable time was consumed in "getting the sums to come



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out right." We had no adding machines to help us, and there must be no mistakes. I was told of a clerk in the Finance Department, which was also <sup>known</sup> in the East Block, who spent a week endeavouring to discover where an error of ten cents in a big account had occurred; and when he found it he went to the different offices to tell his friends that he had succeeded, very much like the woman in the parable, who called her friends and neighbours together to rejoice with her when she found the lost piece of silver (Luke, XV. 9).

Such labour as I have described you may not consider very inspiring but after a while one became quite interested in the conduct of the business of the nation and wished to learn more about the various services. One of the highest and most competent men in the office at the time was Fred Hayter, gold medallist in mathematics in 1878 and my special mentor in matters pertaining to the office. He was in charge of the audit of the Department of Railways and Canals, one of the great spending departments. In order to do his work more understandingly he used to spend his holidays paddling his ten-foot cedar canoe through the waterways of the country. Some of the canal employees actually complained to the Department about his visits, as though they feared he might observe too much! Hayter was no spy, but only wished to perform his duties with the utmost efficiency. After I had been in the service for some months I occasionally went back to my office in the evening to complete some task I had not finished at 5 o'clock, the closing hour. To do this I had to get a special permit which I showed to the Dominion policeman at the door.

When Moore and I went to Ottawa, we fully intended to become permanent members of the Civil Service, and to do this one had to pass a qualifying examination, which was held at stated intervals. University graduates were excused from this ordinary test, but there were certain additional subjects which one could take and for each <sup>subject</sup> one passed, up to four in number, fifty dollars was added to the initial salary, which was \$400 a year. Thus the maximum beginning salary was \$600, unless one had "special technical qualifications." At the



first opportunity I wrote on Précis (I.E., preparing an abstract of a document, which was usually long and involved) and Shorthand. The examination was held in the House of Commons Chamber, and I was successful in both subjects.

About two months after I arrived, Mr. Martin left the Office to accept the position of Professor of Mathematics in the Royal Military College at Kingston. Some years later he became also Director of Studies. After thirty-two years on the staff he retired in 1922. Iva Everard Martin was born at Brighton, Ontario, and having shown in his youth that he had mathematical ability he was sent to St. Catharines Collegiate Institute to receive tuition from W. J. Robertson, who was widely known as a teacher of mathematics. <sup>and whom I have already mentioned</sup> I think Martin was of Irish descent. He had a big body, a florid complexion and behind it was a brilliant intellect which, combined with a kindly disposition, made him a great favourite. The Auditor General asked me to take over his work, and I felt pleased with this expression of confidence.

In the year 1891 the regular decennial census of Canada was taken. In this instance it was done under the Department of Agriculture. Taking the census is a work of considerable magnitude, and requires much preliminary preparation. The whole operation is carefully planned and a Director is appointed. Chief Census Officers are named for the various electoral ridings or counties and they receive general instructions from headquarters. Under them were others whose duty it was to superintend the actual enumerators who went from house to house to secure the information demanded in the blank forms supplied by the Government.

There was a prescribed schedule of pay for the various services, and after payments had been made the vouchers for them were sent to Ottawa. The Chief Officers also made out their personal accounts and forwarded them to headquarters. The examiners in the Auditor General's office were not supposed to inspect or audit any accounts until they had been checked by the Department, but Mr. Lynch, the Deputy Minister of the Department of Agriculture, suggested that I should check and audit the census accounts in one operation in order to expedite the



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settlement. This was agreed to.

I do not recall any irregularities of consequence in the work of the enumerators, but the expense accounts of the Chief Officers varied greatly. Some of the gentlemen in the 'back' ridings were not so innocent and unsophisticated as their urban brethren might imagine. In one instance I remember the total was \$175. I scrutinized it carefully and struck out items which amounted to \$100, leaving a balance of \$75. This revision of the account was sent to the Chief Officer by the Department, and with little objection he agreed to take \$85. Some persons have a closed conscience in financial dealings with the Government.

The population of Canada as of April 5, 1891, was 4,833,239. In 1941, fifty years later, as of June 2, it was 11,506,655



Life in Ottawa. I found Ottawa a very pleasant and interesting place. A more picturesque location for the Capital could hardly be found. The majestic Ottawa river flows at the base of the lofty site of the Parliament Buildings, and alongside Parliament Hill the Rideau Canal ends in a series of eight locks. A boat can start at Kingston and after travelling 126 miles of rivers, lakes and excavated canal, arrive in Ottawa, and then descending by seven giant stone steps, be launched upon the bosom of the swift-flowing Ottawa.

Moore and I used to walk westward to the Chaudière Falls and watch the water rushing over the rocks. Nearby was the great lumber-mill of John R. Booth who, in his plain ordinary clothes, was often seen moving about his vast premises. At that time numerous gang-saws would be cutting through eight or ten logs clamped together on the advancing carriage. These saws certainly "ate up" the logs rapidly, but as the saw-blades were thick and heavy they made much sawdust and a considerable portion of the logs was simply wasted;

I believe soon afterwards band-saws were introduced. They were not so thick and were perhaps not so speedy but they were much more economical.

On some Saturday afternoons we would rent a canoe and make a trip of several miles on the Canal or on the Ottawa river. In the latter case it was much easier to paddle four or five miles down the river than to come back against the current. Now there were often tug-boats which had taken a raft of timber or a bag of logs down-stream, perhaps bound for Montreal or some place on the St. Lawrence river, and were returning to Ottawa or Hull. When we saw one of these tugs coming we would paddle out in the stream and signal that we wished to have a tow. The captain would slow down slightly and the man behind would throw us a rope when we got near him. The one of us in the bow would catch this, or pick it out of the water, and hold it securely, and thus we would be pulled homewards in great comfort. When we came near to our landing place we would put some silver coins in a safe place on the raft, which we would indicate to the man, and then we would "throw-off" and go under our own power again. This was fine exercise and we had pleasure in doing a bit of exploring in this way.



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One of the finest excursions was a trip by steamer down the river to Montebello, 44 miles, and return. At this place the modern exclusive Seigniory Club is located. The fiery French Canadian Louis J. Papineau, (1786-1871) lived at Montebello and our picnic was on the grounds around his beautiful and historic old 'castle'. It was on May 28, 1891. There were eight in the party, some men from the Geological Survey and four ladies. The steamship "Empress" left her dock at 7 a.m. and we had breakfast on board, with the captain at the head of the table. I have never forgotten a story he told. It was of a dinner table on a farm in the south of England at which the country parson was a guest. A servant in bringing in a plate of hot soup accidentally spilt it over the cleric who started <sup>up</sup> and, writhing with pain, pointed to one of the men across the table who was notorious for his fluency in swearing, and said, "You-you answer for me!" I have three 'snapshots', one taken on the ship, the other two at Papineau's place. I note that the men all wore "Bowler" hats, and the ladies-- well they were certainly modestly dressed, which cannot be said of all their successors fifty years later.

One of the most pleasing natural scenes <sup>in the neighbourhood</sup> was <sup>that seen</sup> from the summer house on Parliament Hill just north of the West Block. Here in the early evening, as the sun was about to set in the west, the view over the Gatineau Hills was extraordinarily attractive. Just as the sun was disappearing beyond them one could almost detect the very limbs of the trees as they were projected up into the sky. A <sup>by</sup> drive along the Gatineau river revealed numerous charming rapids, waterfalls, rugged rocks and green trees, which were often visited on Saturday afternoons or on holidays.

As to transportation in the City there was the street-railway with its horse-drawn cars. In the winter the snow <sup>on the roads</sup> was so deep that runners had to be substituted for wheels and the snow continually became packed more solidly until it turned into ice. When the month of May arrived the ice on the tracks was from six to ten inches thick and it had to be removed by an army of men provided with picks and shovels. The line ran from the Chaudière Falls to Rockcliffe, perhaps two and a half miles, roughly parallel to the shore <sup>at the river</sup>. B. W. Sherwood,



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one of the men in our office, described the route followed, more picturesquely than elegantly, as like the "gut of a crane". But the old line was about to be discarded for a new electric system. When I visited Ottawa a few years later it was one of the outstanding features of the city and its owners were keeping it a model for all the country.

Dominion Church. This church, situated on Metcalf Street and not far from the Government buildings, was very convenient for me and I united with it. The minister was E. B. Ryckman and he was a clear thinker and earnest preacher. His son, with the same initials, was a B.A. of Victoria College in 1887 and a lawyer in Toronto, while the <sup>second</sup> ~~eldest~~ <sup>fourth</sup> of his ~~three~~ daughters was a top-ranker in my own class of 1890 in University College. Later she married F. H. Sykes of '85 and lived in Cambridge, Mass.

Ottawa was a somewhat artificial town, as I suppose the seat of Government generally is. Its two chief features were its sawdust and its civil service. Dominion Church was attended by M.P.'s and some members of the Cabinet, as well as by many civil servants, many being highly placed and of superior quality. The audience was inclined to be sometimes critical,--even sixty years ago there was a growing sentiment for younger ministers. On one occasion I complimented Dr. Ryckman for his excellent sermons and he intimated that he wished all were as appreciative as I.

There was an active young people's organization known as the Epworth League, and in its meetings I took part. On one occasion I ventured to read the 'trial' scene from the Merchant of Venice. This play was a great favourite with me and I aimed to pass on to my friends some of the pleasure I had received from it.

At the meeting on January 18, 1891, I gave an address on "Thoughts for the New Year". Taking for my subject, a cheerful forgiving disposition (Eph. iv. 32) I carefully wrote down what I wished to say. <sup>In such a case</sup> I needed the manuscript to guide me; otherwise I should not be able to present my thoughts as I desired (to). It was the nearest to a sermon--or a sermonette-- that I ever got. I have the original manuscript still, and I hope I may be pardoned for saying that I think it was "not so bad".



Perhaps a person may be excused for thinking his own brain-child fairer than others consider it. Many years ago my old class-mate and friend, Alfred Delury, recited to me the following quatrain which seems apropos:

I like to quote the fragrant lines of Keats,  
And often am I caught by Shelley's tone;  
But yet for clever turns and quaint conceits  
Give me some tender <sup>lyrics</sup> of my own.

Another feature of the Young People's work was a service at the City Jail on Sunday morning. Two of my friends asked me to accompany them, which I did. In such a service I never felt comfortable. Some persons are peculiarly able to give a suitable message to such an audience as gathered before us. However I did not "make a break" by saying that I was glad to see them there. One has all sorts of experiences in one's lifetime, but I was not at home among the jail-birds.

Keeping Up Interest in University Work. In my college course, <sup>as I have said,</sup> I had been Secretary of the Mathematical and Physical Society and had prepared papers or physical experiments for presentation at its bi-weekly meetings. Just at this time I was much interested in the theory of molecules and got ready a paper on "The structure of matter", which I sent to the University in February, 1891. In it I outlined the main reasons for believing in the reality of molecules, and described experiments made to determine their size. There was nothing <sup>original</sup> original in it; indeed in those years the question of <sup>original</sup> research in science at the University was not seriously considered, the limited staff having to devote all their energy to give <sup>very</sup> efficient instruction in the various subjects taken by the undergraduates. The paper was read before the Society and afterwards was printed, along with some others, in a publication issued by the Society. I shall refer to this matter later.

There used to be a prize offered annually by University College for English Composition which was known as the Frederick Wyld Prize, named for the donor who was a partner in a big commercial firm in Toronto. Frederick Wyld had a beautiful residential property at the south-east corner of Bloor and St. George



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streets, which was surrounded by a low iron fence. At the south-west corner of his land was a fine rockery in which one could see hepaticas, trilliums, dog-tooth violets and other wild flowers growing as in the woods. The subject for the competition was announced during the college session and it was open to students of the third and fourth years.

For 1889-90 the subject was: "The change in the character of poetry from Pope to Tennyson". This was of great interest to me as I had read selections from Pope, Dryden, Burns, Wordsworth and other poets of that period, and I decided to enter the contest. I possessed the writings of the authors just named and systematically read them over, marking the portions which seemed characteristic and notable to me and making notes of my thoughts. After this I made friends with one of the assistants in the Library of Parliament and borrowed regularly from it week after week. The Library had a good collection of the poets, generally in small volumes without annotations.

I stayed on the job during the summer and then wrote my essay from the materials I had gathered. Typewriters were not common then and so I wrote the manuscript in a "fair hand". I was a bit surprised when it occupied 63 pages or 11,400 words, enough to fill more than a page of a newspaper.

Well, I did not win the prize, which went to W. A. Phillips, a third-year student in Modern Languages. The prize was \$25 in books; but my reward was of much greater value than that. You remember the story of the old man who left his property to his sons, saying that there was treasure buried in the garden. Assiduously they dug over all the land but they found neither gold nor silver. However, <sup>because</sup> on account of the thorough cultivation which the land received, it produced a crop of great value the next and following years. In my case I carefully cultivated the field and have been receiving returns ever since.

Parliamentary Debates. The opportunity to listen to the debates in the House of Commons is undoubtedly the greatest attraction offered to a visitor to the Capital. The fourth session of Canada's sixth parliament had opened on January 16, 1890, and had continued until May 16--some three weeks before my arrival in Ottawa. This parliament could have held another, a fifth, session,



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but there was a general suspicion that there would be an appeal to the country before the full period of five years had elapsed. There was a general depression throughout the country which was, of course, attributed to the inefficiency of the Government, and the fight waged in the House by the Opposition was long and vigorous--in preparation for an election if it should be brought on. I have often thought that our Constitution should be changed so that there could not be a general election for the Dominion or for any Province before the life of its parliament has legally expired, unless the government concerned has been defeated on a want of confidence motion.

However, parliament was dissolved on February 3, and a General Election was held on March 5, 1891. The government of Sir John A. Macdonald was returned, but with a reduced majority,--of about 24, while the majority in 1882 was 70; in 1887, 52. The first session of the new, the seventh, parliament opened on April 29 and it was not prorogued until September 30, 1891. It was a memorable session.

On Wednesday, April 29, the Members assembled in the House of Commons chamber and elected a Speaker, after which they adjourned.

Then next day the formal opening of the session took place. This is always a brilliant society event and it is likewise a significant occasion for every citizen of Canada. It exhibits how our democratic rulers get down to their labours. It is attended by ~~by~~ the Members and their families, even from the most distant ridings, and by as many other persons as can gain admittance to the Senate chamber, where the ceremony is staged. Following the suggestions of my experienced friends in the Office, I was able to see the whole performance.

The scene was full of colour and brilliance, not the least striking feature being the judges of the Supreme Court who, garbed in scarlet robes trimmed with ermine, were seated in a prominent position. The officers and men of the Militia wore spotless uniforms covered with decorations and medals. The Members of Parliament were attired in formal clothes and the ladies, of course, wore their appropriate costumes upon which were displayed many beautiful bouquets and sparkling gems. Indeed the scene was picturesque and historical.



At three o'clock the Governor General, Lord Stanley of Preston, arrived amid the booming of cannon upon the river-bank half a mile away, and took his seat upon the Throne. After prayers by the Chaplain, His Excellency commanded the Gentleman Usher of the Black Rod to inform the faithful Commons that their presence was desired. The contortions of Black Rod have often been described; I suppose they have not changed greatly since 1891. At any rate, the Commons soon arrived. The speaker-elect of the Commons reported to the Governor General that he had been elected by the House of Commons as their Speaker, and the Speaker of the Senate, addressing him, then said:

Mr. Speaker,--

I am commanded by His Excellency the Governor-General to declare to you that he freely confides in the duty and attachment of the House of Commons to Her Majesty's Person and Government, and not doubting that their proceedings will be conducted with wisdom, temper and prudence, he grants, and upon all occasions will recognize and allow, their constitutional privileges.

I am commanded also to assure you, that the Commons shall have access to His Excellency upon all seasonable occasions, and that their proceedings as well as your words and actions, will constantly receive from him the most favourable construction.

Then the Representative of Queen Victoria, in a high-pitched voice, read the Speech from the Throne.

After this he retired and his horse-drawn carriage was escorted to his official residence by the Dragoons and the Foot Guards, two regiments stationed at Ottawa.

Having heard the Speech from the Throne, and having been assured that their constitutional privileges would be recognized and allowed upon all occasions the House returned to their own Chamber, the Speaker bringing a copy of the Speech with him. On motion, it was agreed to consider the Speech the next day. Thus Parliament began its labours.



On Friday, May 1, the House of Commons convened at three o'clock and the debate on the Speech from the Throne began. Two young men, J. D. Hazen of St. John, N.B., and G. E. Corbould of New Westminster, B.C., one from the Atlantic Ocean in the east, the other from the Pacific in the west, moved and seconded, an Address in reply to the Speech of the Governor General.

Then followed Hon. Wilfrid Laurier, the leader of the Liberal Opposition. He was chosen Leader in succession to Edward Blake in 1887 but I had never heard him speak. He was courteous and eloquent, but he analysed the circumstances of the recent election in a masterly way and condemned the manner in which the contest had been fought. The reason for appealing to the electors at this time <sup>had been</sup> ~~was~~ at first given as a desire to secure approval of negotiations with the United States for a wider measure of reciprocity; but in a later manifesto nothing was said about reciprocity, but rather a countinuan<sup>e</sup> of a Protective Policy. He said there were two principal classes in Canada, farmers on one side, manufactur<sup>e</sup>rs on the other; and, apologizing for the simil<sup>e</sup>, he compared the leader of the Government to the bat which claimed that he was a bird when amongst the Birds, but when he fell amongst the rats he said, "Look at my claws, I'm one of your tribe". The Liberals were supporting Unrestricted Reciprocity, which the Conservatives declared disloyal, that it was likely to lead to annexation. The charge of disloyalty, he said, was the most unfair that could be made! He re-<sup>the historic</sup>ferred to Madame Roland, who had aroused passions which she could not control, and when she was led to the guilbtine (November 8, 1793) and was forced to bow to a clay statue of Liberty near-by, exclaimed, "O liberty! liberty! How many crimes are committed in thy name!" After speaking half an hour he concluded with a passionate declaration of devotion to Canada--"as long as there is within me the breath of life, my guiding star, and my only guiding star shall be: Canada first, Canada last, and Canada forever".

The leader of the Government, Sir John A. Macdonald, then took the floor. He had been premier ever since Confederation with the exception of the interval 1874 to 1878, and I had heard him speak in the autumn of 1882 when I was attending



Markham High School. At that time a General Election was near at hand and a political demonstration in support of the Conservative candidate in East York was staged at Markham. The Premier, Senator Plumb and some others had come from Toronto by special train, and had been carried in a procession from the <sup>by</sup> Railway <sup>h.c.</sup> Station at the north, to the Fair Grounds at the south end of the village. As Sir John stood on the speaker's platform, <sup>there</sup> the words flowed from him in a steady stream, but with little eloquence or distinction. Having finished his main address he stood with arms folded, ready to answer any question. One in the audience asked about the "Streams Bill". This was a Bill passed by the Ontario Legislature under Oliver Mowat, but it was disallowed by the Dominion Government. Mowat and Macdonald opposed each other on several constitutional questions and the former usually was the winner. Referring to this particular matter, Sir John started off again to defend his actions.

In early evening a locomotive was sent from Toronto to 'pick up' the special car which had been left on the siding, but unluckily it ran off the track at the switch, and an auxiliary train had to be sent to <sup>put</sup> replace it on the rails <sup>again</sup>. This was not completed until about midnight and by that time, it was reported, some of the visitors had imbibed too freely. I was never enthusiastic about Sir John. There were too many stories told of his 'smartness', and I did not agree with his policy of High Protection. Britain had become great on Free Trade, and I thought the United States was narrow and selfish in raising barriers against other countries. The world has changed since then and international relations are complex and difficult. I am not so sure of some of these things now!

On the present occasion Sir John spoke freely, but he did not have the grace and eloquence of his opponent. His speech was rather short, perhaps twenty minutes. There was reason for his lack of fire, as his <sup>h</sup>health had broken down during the recent election contest, and his <sup>old</sup>time strength had not returned. When the fight was on he could not refuse the urgent calls to address political gatherings all over Ontario. In the interval Feb<sup>ruary</sup> 17-21 he addressed meetings at Toronto, Hamilton, Strathroy, Stratford, St. Mary's and Brampton, and was much fatigued.



Then he went to Kingston and Napanee where he was overloaded with engagements and was exposed to bleak and bitter weather. He caught a chill and was completely exhausted. He went to bed and remained indoors for two months.

The brevity of Sir John's speech was more than balanced by the addresses of those who followed, especially Cartwright, Foster and Charlton, to whom I patiently listened, although I thought they were wasting the time of Parliament.

Sir John Macdonald did not attend every sitting of the House but on Friday, May 22, the expenses of Sir Charles Tupper were under discussion and he was present to defend his friend. Sir Charles was High Commissioner for Canada and was accredited to Great Britain just as is an Ambassador and supposedly was above party politics. But when an election was under way he came back to Canada and strenuously supported the Conservative Party. Liberal members were asking for information about Sir Charles Tupper's visit to Canada.

I was pleased that I was present on that evening. The following is extracted from Hansard:

Mr. Patterson.....if the First Minister will favour us with a reply then, perhaps, we might be able to follow it up with enquiries in other directions.

Sir John A. Macdonald. Well, Mr. Chairman, I cannot resist the seductive tones of my hon. friend and I may answer him: Sir Charles Tupper did go there (Kingston) at my request and he made the speech at my instance, and I fancy that his speech must have had a considerable influence, because in the previous election I was elected by a majority of seventeen, and after Sir Charles Tupper made this speech I was elected by a majority that only <sup>w</sup>ated seventeen of 500. You see I was pretty wise in my generation in asking Sir Charles to go there and make a ~~speech~~ speech for me.

Mr. Paterson. You would be wise if you stopped him at that point.

Sir John A. Macdonald. I will go a little further, and I will say that Sir Charles Tupper came out from England to give us the advantage of his skill and influence, and eloquence, at my special request.



Mr. Paterson. We have succeeded at last. I knew the First Minister would answer.....Now the First Minister might tell us whether he lost his shrewdness in taking Sir Charles beyond Kingston, or whether Sir Charles lost his eloquence.

Sir John A. Macdonald. I will tell you what he did: <sup>he</sup> He lost his voice.

Mr. Paterson......When the High Commissioner was taking his tour through Canada, it was stated in the press that he travelled by special train. I would like to know whether that was the case, and if so, what was the cost of that train and out of what fund it was defrayed.

Sir John A. Macdonald. I am not aware that any of the High Commissioner's expenses were paid out of the public service, but I will enquire.

Mr. Paterson. I suppose his trips from England to this country and back again find a place in the expenses.

Sir John A. Macdonald. That may be, but I cannot say.

Mr. McMullen...... Did he come out for the purpose of attending to elections or other matters of an official character?

Sir John A. Macdonald. I have already stated what I asked him to come out for.

Sir Richard Cartwright. The right hon. gentleman stated candidly that he came out to attend the elections....The hon. gentleman.....was solicitous in procuring some important railway subsidies for projected railways in the neighbourhood of that city.....

Sir John A. Macdonald. You did not do much for them.

It gave me satisfaction to realize later that I had heard Sir John A. Macdonald speak his last words in debate in the House of Commons. Even from his fragmentary replies to his opponents seeking information, one would believe he had a kindly nature which bound his followers to him.

On May 12 he had a slight paralytic stroke which affected his speech but it soon passed off. On May 23, the day after his last appearance in the House, he gave a dinner at which he was in good spirits, but next day he was unwell. On Wednesday night, May 27, he had a second stroke, from which he never fully rallied.



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He passed away on Saturday, June 6, at 10.15 p.m. There was a state funeral in Ottawa on Wednesday, June 10; and as <sup>I watched</sup> the procession moved slowly to the railway station it was deluged with heavy summer showers, so that the bandsmen could hardly play their instruments. Interment was at Kingston.

# On Monday, May 11, the galleries in the House of Commons were crowded; information had gone out that two of the Members were to be impeached for dishonourable conduct. J. Israel Tarte, M.P., a newspaper man of Quebec City, rose in his place and, after fifteen minutes of <sup>introductory</sup> historical remarks, read a lengthy statement giving details of gross dishonesty in connection with tenders for Quebec Harbour improvements, and involving directly Sir Hector Langevin, Minister of Public Works, and Thomas McGreevy, M.P. for Quebec West. These men denied the charges, <sup>which</sup> ~~but they~~ were referred to the Committee on Privileges and Elections. After a thorough investigation the Committee reported that the charges had been proved, and the two men resigned. There were many big barnacles on the ship of state!

Everybody agreed that McGreevy was guilty and should be expelled from the House, but a partisan majority would not condemn the Minister to a like punishment. It was contended that he had not personally profited from the dishonourable operations of a firm of contractors; but if one listened to the extended debate in Parliament, as I did, or read the record of the investigation, one had to conclude that the Minister was at least criminally ignorant of what was going on in his department, and this he virtually acknowledged when he resigned his official position. He knew that large sums of money dishonestly ~~by~~ obtained had been contributed for political party expenses — ten thousand dollars in his own constituency.



Another famous incident of this Session of Parliament was the repudiation by G. E. Foster of his action in voting six years earlier in the House of Commons in favour of immediate total prohibition. Mr. Foster had been a university professor in New Brunswick and had become so distinguished as a temperance advocate that he was elected a Member of Parliament. His debating power in a few years led him to be chosen for the important position of Minister of Finance. I was much interested in Mr. Foster as I had read much of the literature he had produced for use in temperance campaigns.

On May 20 J. Jamieson, M.P. for North Lanark, introduced the following resolution:

That, in the opinion of this House, the time has arrived when it is expedient to prohibit the manufacture, importation and sale of intoxicating liquors for beverage purposes.

Mr. Jamieson made an excellent speech in support of his resolution. A number of others spoke, some in favour of it, some opposed, and various amendments were offered. The debate dragged on for a month. The speeches were non-partisan



and generally of high quality. Of course Mr. Foster's prominence in the temperance field was well known and he was challenged to support their motion. Some of the members investigated his record throughout the country and quoted particularly from the debate on the temperance resolution in the House in 1886, and at which time Mr. Foster voted in favour of legislation for immediate prohibition. When "cornered" thus closely Mr. Foster said, "I did it, and I did it in a moment of weakness"; and after further 'backing-round' to shield the Government, he moved an amendment appointing a Royal Commission to investigate the question of prohibition!

Within an hour, as the debate continued, Mr. Foster was taunted with having moments of weakness, and this continued through the Session. Indeed I am sure this unhappy phrase followed him throughout life and recalled to him how he faltered when the supreme test came.

As the weeks wore on there was endless debate. Opposition speakers would storm about on every question and the Government appeared to pay no attention to them. It seemed like a game--you in, me out! I thought, Why not have a single united body to transact the business of the country? Indeed at the City Y.M.C.A. there was a Men's Club which arranged for a debate on the two-party system of parliament, and I was asked to speak on the side opposing the two-party method. From the Library of Parliament I obtained some books dealing with the subject, and almost convinced myself that a single party would be most effective. My side however was not adjudged the winner. I have never forgotten our discussion; but and my observation in recent years, (1) of many examples of attempts to crush out, or kill off, all opposition and have a single party; or (2) of the operation of a multitude of parties in a parliamentary body; has led me to think that the two-party system is the best that has yet been devised.

Another incident of 1891 was a visit to the Government Printing Bureau to see a Linotype type-setting machine. It had been invented recently in the United States but (on account) of patent complications I believe it was being manufactured in Canada. It was a wonderful contrivance. Upon manipulating a key-board like that of a typewriter, matrices of the letters would fall into place, and when a



line had been completed it would be cast in type-metal. An operator cast my name and address and I have the slug still. In answer to a question in Parliament it was stated that at first the price was \$3500, but later \$3000. At present some country newspapers have several linotypes; *they are almost indispensable.*

Death in the Family. One cannot live long in any community without passing through some sad experience. The daughter of the house where I lived, Lottie Conroy, had just passed her nineteenth birthday at the time that I came. There had been two younger girls, also, but they had been carried off in some epidemic <sup>a few years earlier</sup>. An enlargement from a photograph of them rested on an easel in the "parlor". But Lottie had grown to womanhood, had received a good education and had become an excellent musician. All of us guests in the house paid our homage to her and enjoyed the friendship of the family. A member of the staff of the Geological Survey, a French-Canadian and the only Roman Catholic among us, had become engaged to Lottie. She was quite active and helpful, but in early summer she had symptoms of illness. I think the trouble was internal ulcers, which seemed to improve and then be worse again; and so she and her mother went to Magog in Quebec in the hope that the fresh air and sunshine at that pleasant resort would completely renew her former health. We used to write letters to our friends and receive cheering replies.

I remember putting together some verses which I entitled "Far Away" and which began,

Why is the House so quiet  
These sunny summer days?  
No hand upon the banjo  
Or the piano plays.  
No more the smiling postman  
Drops his billets in the box,  
And gone is half the laughter  
From our verandah talks.

And ended,

O, Charming Magog waters,  
Spread out before their view,  
Give forth your latent powers  
And strength again renew!  
And you, o'er-arching Heavens,  
Send your kindest breezes down,  
To go to those who've left us,  
With perfect health to crown.

I showed this to my friend Martin. He was greatly pleased and insisted that



I should write it out in an engrossing hand and "illuminate" it with various coloured pencils which he brought from the office.

Well, it pleased those who received it, but when, in a few weeks, they returned, I was sorry to learn that a complete cure had not been effected. Indeed as the autumn came on the trouble seemed to grow worse, and although the best of medical service was sought our beloved Lottie gradually became weaker, and on October 23, 1890, she passed away.

A few days before her death Father Whelan visited the house and suggested various things, all of which were done, but to no avail. It was a saddening blow to her family, her lover, to us all.

The funeral service was in St. Patrick's Church, and Mrs. Conroy insisted that Moore and I be allowed to act as pall-bearers, a service which we were pleased to render.

Once more I wrote a few simple verses in order to soften, if possible, the blow felt by the parents. Mr. Conroy had friends in the office of the Ottawa Journal. He showed the manuscript to them and they printed it in the newspaper. Also they made some copies on satin which he sent to his friends. I was not proud of my composition but it achieved its object.

Leaving the Office. In the summer of 1891, a year after I arrived in Ottawa, I was still a temporary clerk, and prospects did not appear bright for the future. So I wrote to Professor James Loudon and asked if there was any opening at the University. He replied that no one had been appointed to the Fellowship in Physics for the session 1891-92 and that I could have it if I wished.

When I informed the Auditor General of the offer from Toronto he said he would not urge me to stay with him. So I wrote to Professor Loudon accepting his offer and I stated that I would be on hand for the opening of the session. I reported this to Mr. McDougall and said I would remain until the end of September.

I had no complaint regarding the work or the pay. Every month or six weeks I received a cheque at the rate of \$2. a day, Sundays and Holidays included.



With this I had ample to defray my living expenses; indeed before I left Ottawa I had paid back the money loaned me during my college course, and all my other debts. But I was anxious to have a definite prospect for the days to come.

Why was I not appointed to the permanent list? At that time every member of parliament and particularly every cabinet minister was burdened with requests for appointments to the Civil Service, and if the Auditor General had simply reported to Hon. G. E. Foster, Minister of Finance, who represented our Office on the Treasury Board, that <sup>he</sup> ~~he~~ needed two new clerks in his office, two persons from the Minister's constituency in New Brunswick would have been supplied to him at once. Of course that would not satisfy the Auditor General. He wished to choose men such as he had tried and tested and who had helped him to make the Office efficient and respected. There were in the Office a number of those political appointments. Some were quite competent and satisfactory but such was not generally the case. So the Auditor had to form his plans for securing good men and to watch for the suitable opportunity to have his choice of clerk appointed on the permanent staff.

As an illustration, when I informed the Auditor General that I was leaving, he went before the Treasury Board and told them that his good men were leaving and that he could not carry on the work efficiently and get out his Annual Report in time unless his men were assured that they would remain in the service. He insisted strongly that my college mate Moore be given a permanent appointment, and that was done.

Most unfortunately Moore did not enjoy the security and responsibility of his position very long. On the afternoon of November 29, 1894, he and W. H. Walker, B.A. '85, of the Governor General's office, went for a skate on the Rideau Canal. The winter was just beginning and the ice was thin in some places. It broke ~~water~~ under Walker and he slipped into the water. Moore lay flat on the ice and reached out to save Walker, when the ice broke under him and he too went into the water. When help arrived Walker was unconscious but his mitts were frozen to the ice and kept him from sinking. Moore had disappeared!



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Appointments to the Civil Service are no doubt made more satisfactorily now. In 1908 the Civil Service Commission was <sup>in</sup> ~~con~~stituted and the merit system was immediately introduced into a part of the Civil Service at Ottawa; and in 1918 it was extended to all appointments.







VII First Ten Years on University StaffFellow in Physics

And so I came back to the University, accepting an appointment for the session as Fellow in Physics.

Such positions were proposed in 1882 by James Loudon who desired to secure young men to assist in the teaching and also to undertake graduate research. The Senate passed the enabling statute and the first set of Fellows were appointed for the session 1883-84.

The fellowships were of the annual value of \$500 each. The selection of Fellows was made from the graduates of the University immediately after the publication of the University Examinations in May. Each Fellow was appointed annually but he could be reappointed for a period not exceeding in all three years.

Each Fellow was required to assist in the teaching and the practical work of the department; to pursue some special line of study therein; and to devote his entire time during the college terms to the work of the department, under the direction of the Professor or Lecturer. The Fellows, according to the statute, "shall be selected with a special view to their aptitude for teaching, along with their acquirements in the work of the department to which each fellowship is attached".

As a matter of fact the time of the Fellow was almost fully occupied with the work of teaching, but I believe every one of them endeavoured to carry on some line of post-graduate study. Young graduates esteemed it an honour to be chosen for this junior position on the University Staff and had pleasure in prolonging their association with their alma mater.

It is interesting to examine the lists of Fellows. Many of them achieved distinction in later years. Below are the names of those appointed for the session 1883-84 to 1893-94 inclusive.



|              | 1883-84                                         | 1884-85                           | 1885-86                     | 1886-87         |
|--------------|-------------------------------------------------|-----------------------------------|-----------------------------|-----------------|
| Classics     | H. R. Fairlough <sup>S</sup><br>J. C. Robertson | J. C. Robertson                   |                             |                 |
| Math.        | J. W. Reid                                      | J. W. Reid                        |                             |                 |
| Physics      | T. G. Campell                                   | T. Mulvey                         |                             |                 |
| Fr. & Ger.   | J. Squair                                       | C. Whetham<br>T.P. Hall           |                             |                 |
| Chemistry    | T. P. Hall                                      | N. McEachern                      |                             |                 |
| Biology      | T. MacKenzie                                    | T. MacCallum<br>A. B. MacCallum   |                             |                 |
| Min. & Geol. | H. R. Wood                                      |                                   |                             |                 |
| Met. & Logic | A. S. Johnston                                  |                                   |                             |                 |
|              | 1887-88                                         | 1888-89                           | 1889-90                     | 1890-91         |
| Classics     | W. P. MUSTARD                                   | W. P. Mustard                     | G. A. H. Fraser             | G. A. H. Fraser |
| Math.        | J. H. McGeary                                   | J. McGowan                        | J. McGowan                  | J. McGowan      |
| Physics      | A. C. McKay                                     | J. G. Witton                      | J. G. Witton                | W. F. Seymour   |
| Fr. & Ger.   | J. H. Cameron                                   | A. F. Chamberlain                 | A. F. Chamberlain           | -----           |
| Chemistry    | F. T. Shutt                                     | G. Chambers                       | G. Chambers                 | W. Lash Miller  |
| Biology      | J. J. MacKenzie                                 | J. J. MacKenzie                   | J. J. MacKenzie             | E. C. Jeffrey   |
| Min. & Geol. | F. G. Wait                                      | F. G. Wait                        | F. G. Wait                  | W. G. Miller    |
| Met. & Logic | T. M. Logie                                     | J. McD. Duncan                    | F. Tracy                    | F. Tracy        |
|              | 1891-92                                         | 1892-93                           | 1893-94                     |                 |
| Classics     | G. A. H. Fraser                                 | R. J. Bonner                      | F. B. R. Hellems            |                 |
| Math.        | R. Henderson                                    | J. W. Odell                       | J. W. Odell                 |                 |
| Physics      | C. A. Chant                                     | G. F. Hull                        | G. F. Hull                  |                 |
| Fr. & Ger.   | W. C. P. Bremmer<br>G. H. Needler               | W. C. P. Bremmer<br>A. M. Stewart | A. Whetham<br>J. P. Hubbard |                 |
| It. & Sp.    | W. Lash Miller                                  | F. J. A. Davidson                 | F. J. A. Davidson           |                 |
| Chemistry    | W. Lash Miller                                  | J. Munro                          | J. Munro                    |                 |
| Biology      | E. C. Jeffrey                                   | T. M. McRae                       | T. M. McRae                 |                 |
| Min. & Geol. | W. G. Miller                                    | W. G. Miller                      | W. A. Parks                 |                 |
| Met. & Logic | F. Tracy                                        | /-----                            | -----                       |                 |



1891-92

1892-93

1893-94

Pol Sciences J. M. McEvoy J. M. McEvoy

James Loudon

James Loudon was born in Toronto in 1841. He attended the Toronto schools, including Upper Canada College. I was informed by one of his contemporaries that when he was leaving the latter institution he had to engage a carriage to take away the many prizes he had won. From the University he graduated B.A. in 1862, with the gold medal in mathematics. I was also informed that he learned the art (<sup>or</sup>science) of self-defence and an example of it was related to me.

On one occasion some fellow-students were playing ball on the east part of the University grounds and a number of hoodlums from the nearby part of the city got hold of the ball and started to play with it themselves. Loudon ran over and although they 'showed fight' he with his superior skill soon chased them off the field. About forty-five years later he visited Go Home Bay, where a summer settlement of University families had been recently established, chiefly through the efforts of his nephew W. J. Loudon, and I saw him rowing in a small skiff. He seemed a professional oarsman in the regular motion of his body and the graceful feathering of his oars.

Loudon was appointed Tutor in Mathematics in 1863, and for one year he was Tutor in Classics also. In 1875 he succeeded J. B. Cherriman as Professor of Mathematics and Natural Philosophy. He was the first native Canadian to receive a permanent appointment on the staff of the University. In 1887 he assumed the title Professor of Physics, and at the same time Alfred Baker became Professor of Mathematics, having previously been tutor in that subject. In 1878 Loudon established the first Physics Laboratory in Canada. During the session 1886-87 he was absent in Europe and while there he became personally acquainted with some of the leading men of science, especially in France and Germany, and he added to the equipment of his Department by purchases of apparatus in Paris.



The Royal Society of Canada was founded in 1882 by the Marquis of Lorne during his tenure of the office of Governor General. Loudon was a charter member, being enrolled in section III, Mathematics, Physics and Chemistry. He was elected President of the Society in 1901. The Council of the Society requested him to supply a list of the scientific papers he had published and he asked me to prepare it. They had appeared chiefly in the PROCEEDINGS of the (Royal) Canadian Institute, which was organized in 1849 and of which he had been a very active member. He was President from 1876 to 1878. The title of his first paper was "On Latin pronunciation" and it is in the PROCEEDINGS for August 1870. In it he argued that we are in doubt as to the precise pronunciation used by the Romans and he advocated the natural English way. This, I may say, was the pronunciation I was taught in the high school.

(generous)

James Loudon was a kindly, agreeable, ~~generous~~ generous man to work under; a scholar rather than a public man of affairs. By nature he was quiet and reticent, and family affliction made him even more reserved. He and his wife had much anxious care for their children, which, one after another as they grew out of childhood seemed to fade away, notwithstanding the parents' most strenuous efforts suggested by preventive medicine. However, of eight born the last four grew to maturity and of these the youngest gave his life in the First War.

Sir Daniel Wilson, the President of the University, died August 6, 1892, and shortly afterwards James Loudon was chosen as his successor. He had grown up with the institution and was familiar with all the problems of its management. He was the logical person to be called to this <sup>(important)</sup> ~~important~~ position. He had spent the fifty years of his life in Toronto and the title "Professor" was always prefixed to his name. It was therefore quite refreshing to me, at the autumn convocation in 1892, to hear Edward Blake, Chancellor of the University, and Richard Harcourt, Minister of Education, refer to him as Mr. Loudon. In his first convocation address he urged the erection of a gymnasium, to replace that in the old Mass Hall.



It was built in 1894, on the site now occupied by Hart House.

Loudon, as I have intimated, had simple domestic tastes and loved the quiet life; but he had a powerful analytical mind, and when he reached a conclusion he thought it should be equally clear to everyone else. It seemed he could not compromise. There had been some serious disagreement over University policy on which, as president, he felt he should take a decided stand. The result was much trouble and bitter personal antagonisms. A committee of the Senate was appointed to inquire into the erection of the Biological Building, and as the President knew I could write shorthand he suggested that I take down the evidence. This was the heaviest job of shorthand writing that I ever undertook. The report of the committee did not bring a peaceful conclusion to the controversy. All the documents relating to this investigation were included in a Return ordered by the Legislative Assembly on April 24, 1893. Unfortunately the relations between President Loudon and Vice-Chancellor Mulock became more strained than before, although, as it has been said, their objects were the same but their methods were different.

In the matter of student discipline Loudon was not very successful. He was not a born conciliator. In 1895 and again in 1905 charges against the University authorities were printed in the undergraduate newspaper THE VARSITY, and they caused an uproar. In the first case the Provincial Government appointed a commission to investigate the matter and sittings for receiving evidence continued for two weeks. I was present most of the time and was asked to give evidence. I was strong for "law and order" and I thought the actions of the students were not justified; and yet they were supported by some members of the <sup>(FACULTY)</sup> ~~Faculty~~ and other opponents of the President. In 1905 another commission or select committee was appointed to inquire into what was really an insurrection of the students, and in this instance great and fundamental changes in the University took place.



These disturbances arose from two sources: (1) The constitution of the University had become altogether unsuited to the prevailing conditions, there was an impossible division of authority. (2) There was a serious lack of financial support, the institution was simply starved by the Government. The University had been growing very rapidly and its income had not increased sufficiently for it to carry on.

In both investigations the commission decided that the President was justified in his actions. It was found that he had been held responsible for things not submitted by him and in some instances for doings of which he had no knowledge. I myself remember an example of this. When in conversation with a Cabinet Minister he informed me, seemingly with some glee, of an appointment made to the University staff without consulting the President. Anyone applying for a position in the University endeavoured to secure political support. But it also became evident that there were divisions and dissensions in the staff and interference by the Government, and that a complete re-organization was necessary.

The full story of these difficult times is presented in a very able and impartial manner in W. S. Wallaces' volume, "A History of the University of Toronto, 1827-1927".

In the course of these serious troubles President Loudon did some very unwise things. Indeed he had not dealt quite fairly and frankly with me, but I could not bear ill-will to him. He had shown confidence in me by appointing me in his own Department and he did me many favours. I felt his real worth had not been properly recognized.

#### William James Loudon

I have mentioned the President's nephew, William James Loudon, who was my colleague and friend for many years. In intellectual acuteness, in ability to win prizes, and in athletic skill he resembled his uncle. He graduated B.A. with the gold medal in mathematics in 1880, at the age of 20, and in 1883 was appointed Demonstrator in Physics.



There had been some extensive purchases of apparatus for the Physics Laboratories, and a demonstrator was needed to give instruction in its use. "W.J." informed me that the first students to take a course in experimental physics were J. M. Clark and A. F. Ames, who graduated B.A. in 1882, the former with the gold medal in mathematics, the latter with the silver medal. Clark (1860-1929) became a well-known lawyer in Toronto, while Ames went to the United States where he became widely known as an educationist. He lived many years in Riverside, Ill., and died May 19, 1931. In 1882 there was a general election in Canada and an attempt was made to organize throughout the country Young Liberal Clubs to take part in the campaign. A deputation came out from Toronto to my home village in the summer of 1882. I remember distinctly hearing J. M. Clark speak. I was too youthful to become a member of a Y.L.Club at the time. After I was appointed on the University staff I renewed acquaintance with Mr. Clark-our tastes were similar.

"W. J." was familiar with every corner of the Main Building and with every feature of the work of the University. He presented many interesting papers at the Mathematical and Physical Society, and wrote a highly-acclaimed text-book on Rigid Dynamics, 1896, perhaps the most difficult subject in the M.&P. course. In 1910 there appeared his book on "The Small-mouthed Bass", which he knows well how to catch; and beginning in 1923 he has published a series of small volumes entitled "Studies in Student Life". They are full of information (with some romance) and written in a lively and entertaining way. The latest of the series is volume 8 (1949) and is a short history of the founding of the Madawaska Club and its early settlement on Georgian Bay during the years 1898-1903.

In 1932 he published "Sir William Mulack, a short Biography" and in it of course gives the defense offered by Sir William for his doings in the unhappy disagreements in the University in connection with the Biological Building and the Medical Faculty. On page 84 is the following.



In the end, the College building was restored along the original lines, though not without much petty strife and ill-will; and a new Library, with a new Librarian, appeared shortly afterwards..... It is quite probable however that, had the walls of University College not withstood the ravages of the flames and maintained, after the fire, much of their former picturesque beauty, the whole University system might have been transferred to some point outside Toronto or perhaps abandoned to its fate.

I was surprised to read this statement, as I did not remember having heard at the time of the fire of any proposal to move the University away from Toronto. Long years after, when many new buildings were demanded and there was little unoccupied space on which to place them the suggestion was made to secure a large area of land some miles from the City and move the University to it.

Vice-Chancellor Mulock was not without blame in the unhappy occurrences in the early nineties even though his object was to benefit the University.

The two Loudons were so familiar with the University Main Building that they almost felt as if they were part owner of it. Indeed every honour student in experimental physics had occasion to "prowl round" the basement and other odd parts of the Building, and in time acquired this same feeling of proprietorship and affection.

On the night of the Great Fire "W.J." was especially anxious to save the valuable apparatus in the west end and he was continually in and out of the west door, carrying the instruments over to the residences on St. George Street. But about 10 o'clock the fire was under control, and the west end was uninjured. The policeman there began to prevent anyone from going inside. "W.J." essayed to enter the big door where the little stone colonnade is and the big officer attempted to stop him. Now "W.J." actually had a key to the door and persisted in going in, and for a few minutes it looked as if there would be a "combat". But at last the officer suspected he was faced by a responsible member of the University staff, and finally he stepped aside. In order to assert his superior authority, "W.J." opened the door and went in, but he did not stay long. He had won his point!



### The Main Building

After the great fire in February 1890 a close-board fence was built round the ruins and steps towards reconstruction were taken. As I have stated, the loss was estimated at \$250,000, the insurance was \$90,000, and the Province provided the balance. As the walls were still standing and in fair condition, it was decided to restore the exterior of the building to be the same as before the fire, but to re-model the interior to suit the new conditions. The greatest changes were as follows:- the Library to be transferred to a separate building, to be erected for it; the objects which were in the old Museum to be placed in the Biological Building; and the space formerly occupied by the Library and the Museum to be made into two large Examination Halls; that considerable portion of the building which had been taken up by the Convocation Hall, to be made into classrooms and private offices for the professors.

As the west end of the building was intact the work of the Department of Physics was carried on there as it had been for some years.

Before the fire the Department had a workshop in the basement of the building. The power for operating some machines in it was supplied by an "Otto" gas-engine which used illuminating gas for fuel. In the reconstruction a real machine shop was provided on the ground floor at the north-east corner, above the new heating plant. At first the gas-engine was utilized in it, but not many years later an electric motor supplied the power. This motor received its current from a D.C. generator located beside a steam-engine in the heating plant below. Electric generators and motors were just coming into commercial use. Our generator was a large one, capable of lighting the building and of supplying current for the motor and for other purposes in the laboratories in the west end.



Of course the Department of Physics used a projection lamp to show lantern slides and for experiments in light. Before I came to the University as an undergraduate the lime-light had been used as the source of light. To produce it an oxy-hydrogen flame was sprayed on a cylinder of lime like a chalk crayon which was thus raised to a high temperature and emitted a powerful white light. This was very effective, but it required skilful manipulation and was expensive. The old oxygen and hydrogen gas-bags were still "kicking round the place" but I never saw them used. In succession to the calcium light, the arc lamp had been adopted. Our lamp was made by Duboscq in Paris. It was self regulated by clockwork and of course required direct current to actuate it. The source of the current was a battery of about forty Grove cells. In this cell the electrodes were a platinum sheet in nitric acid and a zinc plate in dilute sulphuric acid. These cells were messy and corrosive and unpleasant to use, and every time the lantern was needed they had to be set up afresh by the Department's handy man. His name was Bullen and he had become expert in preparing the apparatus and in assisting the lecturer when he used it. In the autumn of 1889, in my final year, we were surprised to learn that Bullen had lost his job. He told us students in M.&P. about his hard luck, and some one proposed that we go to the Government to protest on his behalf. It was not suggested that we appeal to the University authorities!. However we did not do it.

Why had this man been dispensed with?. Bullen was a capable assistant and kept the apparatus in order. But Prof. Loudon recognized that the electrical age was coming in rapidly and that there would soon be more experimental research in physics. He thought that the assistant in the Department should be a competent machinist who would divide his time between working in the shop and helping in the lecture room. Now W. J. Loudon informed me that in the fall of 1889, when in Montreal, he met by chance R. A. Ross and J. S. Plaskett, both from Woodstock, Ont., who had just returned from the United States where they had been working in the Edison Machine Works, which in 1886 had been moved from New York City to



Schenectady N.Y. Plaskett was looking for a position. "W.J." directed him to Prof. James Loudon who offered him the position of Mechanician in the Department of Physics, his duties to include assisting in lecture demonstrations. This was the beginning of his brilliant career, which ended Oct. 17, 1941, at Victoria, B.C. where he had been director of the great observatory there. His friend Ross became a distinguished engineer and died in Montreal in 1936.

Plaskett soon got tired of setting up the Grove cells to run the lecture lantern, and to replace the messy battery he constructed a 'dynamo electrical machine'. He designed the machine, made the patterns for it and built it in his shop. It resembled the regular Edison type with vertical field magnets. His experience in the Edison works served him well.

What became of Bullen?. I suppose his salary was not over \$500, but I understood he was thrifty. A few years later I was informed that he was the owner and manager of a large apartment house in the neighbourhood of Surrey Place, within a stone's throw of Queen's Park!.

On the ground floor of the Main Building, immediately west of the main tower were three rooms about thirty feet square. These and the Museum above them had been flooded with water during the fire, but not seriously injured, and were all in regular use by October 1, 1891, when I returned as Fellow. James Loudon occupied the room next the tower as a private office, and he allowed me to have a small table in it for my use. The other two rooms were then used for lectures.

My work was largely to supervise the practical experimenting in the laboratories, although I had a limited amount of lecturing. Among the courses given by James Loudon was one on Elementary Mechanics, and the class taking it was rather large. The principles of the subject are rather abstract and require careful thinking, and there was no suitable text-book. So he undertook to prepare a syllabus of his lectures, with diagrams, and I made copies of the notes for each lecture



by means of a simple form of mimeograph bearing the name of Edison, although I doubt if the great inventor devised it. The same method is used still, a type-writer being used to produce the perforated wax paper pattern known as stencil. I am sure there was not in 1891 a typewriter in the University. I remember when James Brebner, who was a member of my class, was appointed Registrar in 1893 and he introduced the first writing machine into his office some time later.

The Syllabus, with suitable examples and problems, was afterwards set in type and was published in October in 1892. I believe it helped the students to fix their ideas; and indeed it impressed upon my mind the significance of VELOCITY, ACCELERATION, MASS, MOMENTUM and other terms used in Mechanics. In preparing the little book I discussed the subject with John Galbraith, the famous Principal of the School of Practical Science. Those who have ever been his pupils will recall the clear-cut and positive manner he had in teaching this subject, and I give him credit for clarifying it to me.

#### The M. & P. Society Again

For a considerable time I had a great interest in the history of science and I liked to examine some of the old apparatus which had accumulated at the University through several decades. Some of the instruments were to illustrate electrical phenomena. For the session 1892-93 I had been chosen president of the M. & P. Society, and a meeting open to the public was arranged for February 17, 1893, at which I was to speak on "The Developement of Electricity". There was a houseful of students and their friends.

I aimed to illustrate experimentally the various phenomena of electricity, and in exhibiting the production of electricity by friction I used an old French machine made by Cane. I practised on it until I became familiar with it, but when the time came to demonstrate it before my audience, it would not go at first.



I was taken aback and had to operate the machine for some time before the crackling sparks came. I did not realize that the large number of visitors had filled the air with moisture and caused the machine to fail.

Michael Faraday and John Tyndall had written several elementary books on Physics illustrated by striking experiments; they were the public lecturers whom I desired to emulate, and it was said their experiments never failed. Evidently they made more thorough preparation--which I endeavoured to do thereafter.

Included in my lecture was an account of the laying of the Atlantic Cable. This great accomplishment still called forth the admiration of young and old, learned and ignorant. The failure of the first cable, laid in 1858, after transmitting a few but important messages, aroused deep regret. The attempt was renewed in 1865, with improved means, but the cable parted in mid-ocean, 1050 miles from Ireland, and the cable could not then be retrieved. Finally in 1866, with an extra-length of fresh cable and better methods of handling it learned from past experience, and with William Thomson as chief engineer, a cable was laid from Ireland to Newfoundland. Then leaving on the shore one end of the extra cable, the famous GREAT EASTERN sailed eastward, paying out the cable as it made its way to the point where the cable had been lost the year before. It was located and with great difficulty was brought to the surface. The end was led into the instrument room and the cable was found to be in excellent condition. The new cable was spliced on to it, and thus there were two complete cables connecting Europe and America.

Those were inspiring days, but we have travelled far since then. Eighty years later, with little sense of wonder, we talk by telephone with friends on another continent, or listen in the radio to the world's most important proceedings as they are being carried on in a distant land.



The lecture closed with a quotation from Tennyson, who had just published a new volume in which he seemed fully to realize the spirit of the time:

As we surpass our father's skill,  
Our sons will shame our own;  
A thousand things are hidden still,  
And not a hundred known.

And had some prophet spoken true,  
Of all we shall achieve,  
The wonders were so wildly new  
That no man would believe.

Meanwhile, my brothers, work and weild  
The forces of to-day,  
And plough the present like a field,  
And garner all you may!

You, what the cultured surface grows,  
Dispense with careful hands;  
Deep under deep forever goes,  
Heaven over heaven expands.

#### M. & P. Society Officers, 1890-95

The president and the secretary-treasurer of the Society during the period 1890-95 were:

|         |                        |                          |
|---------|------------------------|--------------------------|
| 1890-91 | Pres. J. McGowan, '88; | Sec.-Treas. R. Henderson |
| 1891-92 | " W. J. Loudon, '80;   | " G. R. Anderson         |
| 1892-93 | " C. A. Chant, '90,    | " E. E. Reid             |
| 1893-94 | " A. T. DeLury, '90,   | " F. A. Saunders         |
| 1894-95 | " G. F. Hull, '92,     | " W. W. Nichol           |

*Nichol*

#### Volumes published by the Society

During the above session some papers were read before the Society which the members wished to preserve in printed form. This was done in three volumes, spread over the years, of about sixty pages each. The cost was met by securing some advertisements and by subscriptions among the staff. I had much to do with these publications, and I should like to remark that James Loudon was very generous in his contributions. Indeed I always found him willing to assist any project which he thought worthy of support.

Below is a list of the papers as they appear in the thin volumes:



Year 1890-91

PROFESSOR BAKER, Poetic interpretation in Mathematics.  
 A. T. DeLURY, Deduction from Dr. Graves' Theorem.  
 C. A. CHANT, The structure of Matter.  
 F. SANDERSON, The Law of Human Mortality.  
 R. HENDERSON, Newton's Laws of Motion.

Year 1891-92

W. J. LOUDON, Musical Scales.  
 I. E. MARTIN, The Religion of Algebraic Curves.  
 C. A. CHANT, The Wave Theory of Sound.  
 W. GILLESPIE, Some Trigonometrical Expansions.  
 G. R. ANDERSON, Time measuring.

Years 1892-93, 1893-94

A. T. DeLURY, (Translator), On the Non-Euclidian Geometry.  
 J. C. CLASHAN, Elementary Proof of a Theorem in Trigonometry.  
 C. A. CHANT, The Developement of Electricity.

Also the following abstracts:

A. M. SCOTT, The Imaginary Roots of Unity.  
 MISS J. S. HILLOCK, Laplace.  
 MISS A. LINDSAY, Life and Work of Maria Agnesi.

In the following year an attempt was made to print the papers presented to all the student societies in a single periodical publication. The societies then in operation were: Classical Association, Modern Language Club, Mathematical and Physical Society, Natural Science Association, Philosophical Society, and Political Science Club; and the name chosen for the publication was, THE UNIVERSITY OF TORONTO QUARTERLY. The first number was dated March 1895, and it was issued at irregular intervals until December 1896. It was paged continuously through three volumes, 586 pages in all.

For such a publication to succeed it should have an editor with experience and devoted to his job, and also sufficient financial support. One is not surprised that its life was not long. On examining the printed record one finds many papers still worth reading and the names of numerous authors who achieved distinction in after years. I pick out a few almost at random:

J. LOVELL MURRAY, Bright and Gladstone as Orators.  
 R. ORLANDO JOLLIFFE, How far did Caesar fulfil the political needs of his times.  
 MISS J. A. STREET, Early Greek lyrics.  
 G. F. HULL, Kindred Phenomena.  
 W. H. PIKE, Limitations of the senses.  
 ALFRED BAKER, Mathematics as a means of culture.



|                  |                                                |
|------------------|------------------------------------------------|
| J. B. MacCALLUM, | The fresh-water Cladacera.                     |
| F. TRACY,        | The Scottish Philosophy.                       |
| R. H. COATS,     | Some phases of Altruria.                       |
| W. A. PARKS,     | The developement of the science of mineralogy. |
| A. R. CLUTE,     | Recent labour troubles in America.             |
| R. S. LILLIE,    | The ancestry of the vertebrates.               |
| B. K. SANDWELL,  | On translating Homer.                          |
| M. W. WALLACE,   | The dawn of Romanticism in French Literature.  |
| F. B. PROCTOR,   | The expansion of the modern state.             |

#### Appointed Lecturer in Physics

During the session 1891-92 when I was a Fellow I found much to engage my mind and I greatly enjoyed the work. Just then several permanent positions on the staff of the University were created, one of them being Lecturer in Physics. I applied for this and Professor Loudon supported me. I remember sitting in the living room of his residence on St. George Street one evening in August 1892, waiting for him to come home from a meeting with members of the Government; and in the growing darkness he arrived, and told me that my application had been accepted.

In the TORONTO GLOBE for August 11 the appointment was announced, but it was not until the end of September that I recieved the following communication:

Department of the Provincial Secretary  
Ontario

Toronto, Sept. 29th., 1892

Sir,

I am commanded by His Honour the Lieutenant-Governor in Council to inform you that he was, by the Order dated the 13th of August last, pleased to appoint you to be Lecturer in Physics in the University of Toronto, at an initial salary of \$800, said appointment to take place on and after the 1st of October next.

I have the honour to be,  
Sir,  
Your obedient servant

G. E. LUMSDEN

ClarenceAugustus Chant Esq, B.A. Assistant Secretary  
Toronto, Ont.



The salary was not very high, but the position was very attractive. I thought, how fortunate to be on the ground when the opening was made!. Thirteen months later I received the following letter.

Toronto, November 18, 1893.

Sir,

I am commanded by His Honour the Lieutenant-Governor-in-Council to inform you that he has been pleased to direct that, from and after the 1st day of October, 1893, you be paid the salary of \$900.

I have the honour to be

Sir,

C. A. Chant, Esq., B.A.;      Your obedient servant,  
Lecturer in Physics,  
U. OF T., Toronto, Ont.      G. E. Lumsden, Ass<sup>t</sup>. Sec.

I may remark that the person whose name is appended to these letters had a famous signature <sup>which</sup> could hardly be forged by any one. Mr. Lumsden, I believe, had been a newspaper man in Hamilton. As I found out later he was an accomplished amateur astronomer as well as a very capable civil servant.

When the University was known as King's College it had a Medical Faculty. This, however, was much criticised, and when in 1853 King's College became the University of Toronto the Faculty of Medicine was abolished. There was a strong sentiment that the training of physicians and surgeons should not be a charge against the University endowment or against the Government. It was left for certain physicians, as private citizens, to organize medical schools and treat them as business adventures. They were affiliated with different universities which granted the degrees in medicine.

But in 1887 when the entire scheme of University education in Ontario was being re-moulded a Faculty of Medicine was re-established. The private medical schools in ~~Ontario~~ Toronto ceased their separate operations and united to form a Medical Faculty worthy of the University of Toronto.

One reason for this change in policy was the recognition of the importance of an introductory training in science—in physics, chemistry and biology—as the only



solid foundation for a modern medical course.

So an elementary course in Physics was prescribed, and A. C. MacKay of McMaster University was appointed temporarily to give them. McKay was a gold medallist in 1886 and was an excellent lecturer. But it was decided in 1892 to appoint a permanent Lecturer in Physics, a part of whose duties should be to give this instruction to the students in medicine. The course is described in the University Calendar for 1892-93 as:

An introductory course of experimental lectures on physics will be given to the students of chemistry, of natural science and of medicine.

These lectures were at 12 o'clock on Monday, Wednesday and Friday and I continued to deliver them for about twelve years. It has given me pleasure to meet physicians throughout the country who took this elementary course in physics. The field to be covered was wide. The text I recommended was GANOT'S PHYSICS, a 1000-page volume, famous in its day, and to assist the students to select the important sections I had a 25-page booklet printed, giving a synopsis of the lectures, with references to the paragraphs of the book. The lectures were illustrated with experiments and my able assistant was J. S. Plaskett.

I never forgot my indebtedness to James Loudon for my appointment in 1892 as Lecturer in Physics. He was loyal to his former students. His kind nature and simple domestic tastes have seldom been referred to by his biographers, but I have always admired him for them.

### Study of Electric Waves

At this time new discoveries in electricity were coming to my attention. One of the ablest graduates in physics in 1892 was Gordon Ferrie Hull<sup>\*</sup>, who came from a village named Garnet, near Hamilton, Ontario. He acted as Fellow in Physics during the three years 1892-95, and we had similar tastes. We had heard of some



researches by a German named Hertz and we were anxious to learn about them. So we obtained from Germany a paper-bound volume containing a reprint of papers contributed by Hertz to DIE ANNALEN DER PHYSIK UND CHEMIE during the years 1885-89, and now collected under the title, "Die Ausbreitung der Elektrischen Kraft" (The spreading-out of electrical force).

\* Hull was one of the earliest graduate students at the University of Chicago, and was professor of Physics at Dartmouth College in New Hampshire for many years.

Now neither of us could speak German, but we realized that such was an absolute necessity, so we took some lessons in that subject and began to dig into Hertz's book. It was hard going. Not only was the language difficult to read, but the ideas Hertz tried to convey were new and strange and hard to understand.

In my study of electricity I was familiar with frictional or static electricity, and had seen how a charge given to one conductor (say, a metal ball) could "induce" a charge in a neighbouring conductor apparently not connected with the first. Then when one turned to current electricity, such as is produced by a "Galvanic" cell, we got something quite different. The current seemed to flow through a metal wire just as water flows through a tube. When the circuit was broken the current ceased to flow. These phenomena were both considered manifestations of electricity, but they were entirely different in nature. Then I had seen it demonstrated experimentally that if a current is MADE or BROKEN in one coil of wire, a current will be induced in another coil near it, even if there is no metallic connection between them. There were many and varied and puzzling electrical phenomena.

We continued to worry out the German phrases and sentences and at last the meaning of what we had read began to dawn upon us. An English translation of Hertz's book was published in 1893, under the title "Electric Waves", but it did not help greatly. The very condensed form in which Hertz published his researches made the understanding of them not at all easy. Indeed I found I had much to learn of the very fundamentals of electricity.



Also it was revealed to me how some of these original researches were made, especially in Germany, where this sort of work seemed to be the chief business of the university professor, not the instruction of students. Scientific research seemed almost non-existent in the United States and Canada; also it was carried on quite differently in England, France and Germany. Conditions have changed greatly since then, there has been a real transformation in the New World, research is the word one hears everywhere now!

Hertz died on January 1, 1894, at the age of 37, and for so young a man he had made a large number of researches. Those on electric waves were of the utmost importance in their theoretical bearing. Faraday, recognized as the prince of experiments, roughly between 1830 and 1850, had published a series of results he had obtained in his experiments on electricity, and he declared that the seat of the electric action was not in the conductor but rather in the space around it. Then Maxwell, a Scottish physicist (1831-1879) deliberately set himself the task of expressing Faraday's laws by mathematical formulae and equations, and upon interpreting them he stated that electrical action must "spread out" or travel through space with the speed of light. Finally Hertz demonstrated experimentally that such was the case—that the action was propagated as waves which could be reflected, refracted and polarized, thus resembling, in all essential features, light waves.

#### Lecture before the Astronomical Society

My attention was early attracted by the notices in the newspapers of the meetings of the Astronomical and Physical Society of Toronto, and I was elected a member of it on December 13, 1892. I was greatly interested in the reports of observations made by the members, and was impressed by the knowledge shown by some of them in answering questions regarding objects in the sky, especially as to the suitability for observation at the time.



It was before this Society that I gave on November 26, 1895, a lecture on Hertz's discoveries and their significance. The title of the lecture was "Electric Radiation". I constructed new apparatus, similar to some used by Oliver Lodge in England, and showed how electric waves could be produced, how they could be propagated through space, and how they could be reflected from a sheet of metal, refracted through a big prism of pitch and polarized by a grid of wires - indeed that they quite similar to light-waves, except that they were much longer. I believe this was the first public demonstration of these facts in Canada.

This was not original research, but it exhibited to the public some of the important results of the latest investigations.

#### Saturday Lecture at the University

At this time the University offered to the public, during the session, a series of popular lectures on Saturday afternoons. I was asked by President Loudon if I would speak on the investigations I had been making in electricity. So on February 8, 1896, I spoke on "Electric Waves". Usually the lectures were given in the large lecture room of the Chemistry Building which had been erected in 1894. Some of the most interesting and entertaining lectures I ever listened to were given on these Saturday afternoons. Ernest Seton Thompson (as he was then known) spoke on February 10, 1900, on "Wild Animals I have Known", and Dr. W. H. Drummond, of Montreal, spoke on his French Canadian poetry on February 18, 1899, and again on January 21, 1905. Thompson had lived in or near Toronto and was well known there. My wife told me that when she was a little girl she once acted as a model of Little Red Riding Hood for him to draw. He died at Seton Village, New Mexico, on December 23, 1946, aged 86.

As I had much apparatus for my experiments, it was decided that my lecture should be in the auditorium of the Biological Department. Saturday was a fine mild day. At 9 o'clock I was at the University, and Plaskett and I put my bulky apparatus on an express sleigh and went with it to ~~another~~ the other building.



there we tried it and all worked pretty well. In the after noon the big room was filled. Some were standing at the back and some were unable to gain admittance. It gave me special pleasure to see many professors and lecturers there. Everything went just perfectly. When I had finished, many gathered round me to congratulate me, and all seemed very much pleased. I was, too.

After the lecture I was asked by a young reporter for an account of it. This I prepared, and it appeared in the Saturday illustrated supplement of the TORONTO GLOBE of February 15, 1896, along with a photograph of my apparatus taken by E. C. Jeffrey, then Lecturer in Biology, later a distinguished professor at Harvard.

Perhaps I may quote the last paragraph of the printed report:

I hope I have shown you that there is radiant electricity as truly as there is radiant light; and moreover, that they follow similar laws. The present trend of physical theory is seen in the attempt to explain the forces of magnetism and electricity, gravitation, etc., as due to an omnipresent ether. Let me add one more word. Many of you, no doubt, would like to know of any practical application of the great discoveries to which reference has been made. On this side of the ocean we are very prone to ask what is the money value of it, especially when electricity is concerned. The very mention of the word usually calls before the mind pictures of steam-engines and dynamos, rattling street cars and brilliant street lamps, unsightly telephone and telegraph poles, or perhaps a covetous wish for some of the half-yearly dividends. But I do not know that a single dollar has been invested to exploit any application of the new principle. The three physicists whose names are most prominent in its development—Faraday, Maxwell and Hertz—are three beautiful examples of men who have purely devoted their extraordinary abilities to the cause of purely scientific investigation, which is indeed the highest interest of mankind, knowing well that "science is, like virtue, its own exceeding great reward".

At that time these investigations were recognized as of profound theoretical importance, but no one dreamed of the extraordinary practical applications of electric waves in future years. I shall refer to this matter again.

The young reporter was W. L. M. King, B.A. 1895, and afterwards Premier of Canada for twenty-one years.

### Elementary Physics Laboratory

Before the great fire, on the ground floor of the Main Building, immediately west of the main tower, there were three rooms, perhaps thirty feet square as I have mentioned. That one next the tower was Professor Loudon's private office, the other two were lecture



rooms. In the reconstruction these two rooms were made into a single room, to be used as a laboratory for elementary practical physics. There was a big slate sink at the west end, a large instrument case at the south end, and numerous heavy tables throughout the room, as well as brackets on the walls, upon which to set the instruments. There were several gas-outlets to provide for Bunsen Burners or for other purposes. The room was lighted by four electric chandeliers suspended from the ceiling, and extension cords were run from some of their lamps to carry current for various experiments. A year or two later these cords were dispensed with and heavy insulated wires were run around the walls of the room with outlets at convenient places. The safest way to put in switches and fuses had not been embodied in a code, and we had to change our wiring continually.

Of this splendid new laboratory I was given charge and I was proud of it.

The first class to which I gave instruction in Practical Physics in this laboratory was the third year in M. & P. in the session 1892-93. All students in the M. & P. course remained together until the end of the third year, but for the fourth year they divided into two parts, one part taking Pure Mathematics, the other Physics. At the present time several other options are available.

The M. & P. Class of '94 was a small one, beginning with 12 in the first year and falling to 9 in the third. During the session I took a group photograph, using the 5 7 camera belonging to the Department. The students were arranged about a work-table on which one can recognize a spherometer, a hydrometer, a goniometer, a spectroscope, beakers, calorimeters, etc.

The names of the students were:

Louise D. Cummings (Hamilton), b. 1870, d. May 8, 1947. Was Professor of Mathematics at Vassar 1902-1936.

Margaret L. Robertson (Brampton), d. July 16, 1934. Was on the staff of Barnard College and Central High School, N.Y. Private Tutor to students of Barnard, Bryn Mawr, Cornell, Harvard, Princeton, Yale.

James J. Brown (Toronto). Was a Presbyterian, later United Church Minister. Some years at Ayr, Ont.

Francis H. Frost (Belleville). Teacher at Bowmanville, Perth, Leamington.

Wesley E. James (Bowmanville). Taught in Wesley College, Winnipeg.

David McLennan (Stratford). For some time in Civil Service, Ottawa.

Edward E. Reid (London). b. Mar. 10, 1872, d. XX Sept. 24, 1941. Was Manager of the London Life Insurance Co.

George W. Rudlen (Toronto). b. 1874, d. Jan. 26, 1933. Teacher of Mathematics in Calgary, Sault Ste. Marie, Toronto. Interested in Library work.



Walter H. Williams (Part Perry). B.A. 1899.

The famous Cavendish Laboratory at Cambridge University was inaugurated in 1874 with James Clerk Maxwell as its first director. When he was about to meet his first class he prepared an introductory address which was afterwards printed in Maxwell's Collected Papers. Now Maxwell was one of my heroes in the world of science, and taking pattern from him I put my thoughts together and read them to my small class when I met them first in my new laboratory. I explained the object of our work and how we should carry it on, and wished them success and pleasure in our association together.

The Third Year M. & P. Class gave me particular pleasure. They were all serious students, and, working with them in the laboratory I was able to become well acquainted with each of them. I found out where they came from and what they intended to do, and I tried to follow them through the rest of their lives. Of course I gave lectures to them, too, but there is not the same personal contact in the lecture room that there is in the laboratory.

As soon as I had a home of my own my wife and I entertained the Third Year Class at a "party" in the month of February. We called in a number of our young women acquaintances so as to equalize the 'boys' and 'girls', and started them off in pairs to solve some new 'problems' which had been provided for them. There was no difficulty in keeping the programme going—once started, it went forward in a lively fashion, like a veritable "chain reaction".

The first party was on February 28, 1896, and they were continued for many years. The last gathering of the Third Year was at my home in 1935, after we had moved to Observatory House. That was the year of my retirement and the Class presented me with a walking stick, suitably inscribed.

Besides the M. & P. Class I had students in Natural Science and in Mechanical and Electrical Engineering in my laboratory. Many of these became teachers of science in the Ontario high schools, and thus I had valued personal friends in educational positions throughout the Province.



James Russell Lowell

It was in the month of November 1890 that a friend presented me with a copy of Lowell's poems, and as that friend was a highly esteemed young lady I dipped into it without delay. I found much to interest me. At that time I knew little of the New England writers. During my college course I did not spread my efforts far beyond the work prescribed in the curriculum, but now I was free to devote my time to any worthy subject. I had heard that the atmosphere in the neighbourhood of Boston had the blue tinge of exclusive culture; also, I had not forgotten "The autocrat of the breakfast table". Further, I was attracted to Lowell not only by what he had written but also by the service he had rendered to his country as ambassador abroad.

The "Biglow Papers" appealed to me most strongly. The American Civil War ended just as I was born, and personal incidents in it and stories with it as a background were continually coming to my attention when I was a boy. My father told me that it was while he was walking back from a trip he had made to Markham village that he learned of the assassination of Abraham Lincoln on the previous evening (April 14, 1865). Many of the songs of the Civil War had come to Canada and were familiar to us. We boys and girls did not appreciate the significance of "Marching through Georgia", but the tune was stirring. However the pathos of "Dolly Gray", "Tenting on the old camp ground", "On the old Kentucky shore far away", and of many others did not require any explanations. I remember seeing, about 1875, around my home a paper-covered book perhaps half an inch thick containing the words of familiar songs, including "Captain Jinks", "A daring young man on a flying-trapeze", and another entitled "Beyant on the boulevard". The latter I could not understand; I took the first word to be a man's name, instead of the Irish form of "beyond".

Thus the subject of the Biglow Papers was not foreign to me and I thought ~~XXX~~the poems, with their erudite editor, Homer Wilbur, A.M., were extraordinarily clever. David R. Keys was one of my best friends on the staff of University College, and he asked me to read a paper on "Lowell and the Biglow Papers" before the Modern Language Club. It was



rather unusual for an M. & P. man to appear before this large society but I considered it an honour and I enjoyed the experience. The paper was printed in the Christmas number of The Varsity, December 13, 1893, and later in the Methodist Magazine. The latter was about the only literary magazine produced in Canada at that time and to it I contributed a number of popular scientific articles during the years 1895-1900. The Magazine was really the personal effort of W. H. Withrow, the editor of the Sunday school periodicals and some other publications of the Methodist Church. It was a creditable production. He had meagre funds to spend on it and the circulation was not large. Withrow died in 1908 and I believe the magazine did not long survive.

In The Varsity for November 29, 1893, appeared a sketch entitled "The Earth is flat". This is an account of a trip from Port Dalhousie back to Toronto on a Monday morning, on which occasion I had an argument with a man who believed the earth was flat and the sun only 700 miles away. He told me he had obtained his ideas from a book published in London, England, some years before. The title of the book was "The earth not a Planet" and the author hid his identity under the pseudonym "Parallax". The book achieved some notoriety. Unless a man's mind is open to conviction argument with him is vain!.

#### Thoreau and his "Walden".

For many years I have enjoyed the writings of Henry David Thoreau. Usually a copy of "Walden" is found in my travelling bag. It came to my attention through the kind services of Miss E. A. McMicking, one of the assistants in the University Library during the 'nineties. She used to secure for members of the staff, at reduced prices, foreign books and have them enclosed in cases destined for the University of Toronto.

She introduced me to the Camelot Classics, an excellent series of the leading prose writers which was being published at a shilling a volume. I obtained about a dozen of these books, among them "Walden".



During the First World War I assisted my friend A. E. Lang (Professor of German in Victoria College) in his attempt to raise potatoes on his land on Scarboro Heights, near Scarboro village. Our experience hoeing potatoes was much like Thoreau's hoeing beans. We could not keep ahead of the twitch-grass. In the autumn we found roots of the twitch actually passing through the potatoes, looking indeed as if the potatoes had been threaded on the long grass roots.

Well, on one Saturday evening my wife and I were returning to the City after my day's agricultural labours when my little leather bag containing "Walden" and some other things was stolen by some one in a crowd which boarded the trolley. I tried to secure another Camelot copy but in vain, and bought No. 281 of Everyman's Library instead. This I have carried about with me ever since, filling the margins and blank spaces with the numerous typographical errors I have discovered and with notes on Thoreau's questionable explanations of physical phenomena.

In 1922 I was in Suva, the capital of the Fiji Islands, and having a few hours on my hands I visited a store in which there was a collection of second-hand books left behind by a retiring Chief Justice when he went back to England. There was a copy of "Walden" similar to the one I had lost, and of course I bought it for a few pence. Having the Everyman copy with me, I gave this one to my companion R.K.Young.

I don't think he caught the "Walden" fever as I had. I have in my library numerous other editions of "Walden" but none quite so convenient in size and type. Meantime I have been "toting round" my poorly printed pocket copy and reading it almost yearly. Its piquant philosophy never fails to give me interest and satisfaction.

#### Ice Storm of December 15, 1893.

Upon my return from Ottawa I lived for three years at 61 Wood St. This was convenient to the University and to "down town". In the course of time this house and many neighbouring ones were torn down to make way for the Maple Leaf Gardens, where reigns the god of sport.



I obtained my meals at the north-east corner of Wood and Church streets in what had been a spacious residence a few years earlier. To reach the front door one had to go up some ten steps, but the dining room was in the basement and was entered directly from the street.

Twenty years later that dining room became a plumber's shop!. In 1893 about fifteen persons ate their meals there,- public school teachers, normal school and university students, business men and women, a musician, an artist and a doctor. It was a congenial company and there was a jolly time as the jokes and rapid repartee passed back and forth at the evening meal.

A Christmas party was arranged for December 15, at which date none of the boarders would have left for home. A programme of toasts was prepared, with suitable quotations, and I made a number of copies on our mimeograph at the University. I have my copy still and it recalls the occasion vividly.

The first toast was to "Our Queen and her governments" and the accompanying quotation (from the "Biglow Papers") was:

I do believe the people want  
A tax on teas and coffees;  
Thet nothin' aint extravagunt  
Purvidin' I'm in office.

Two names of boarders were added to reply to the toast. They were Foster and Charlton, which were names of politicians of the day.

So it continued through the six toasts which filled the evening. The toastmaster was G. F. Hull, who succeeded me as Fellow in Physics at the University, and I wonder if any others of the party besides Hull and myself are still living (1949).

On going home, before midnight, we found the streets covered with ice. A fine rain fell all evening and continued beyond midnight and the temperature was below the freezing point. Consequently the ice steadily increased in thickness and immense damage resulted. Great wooden poles carrying hundreds of telephone and telegraph wires were broken off and crashed to the ground. Trolley and other power lines were disrupted. Shade trees were



crushed under the great weight of ice and large limbs were broken off. The silver maple trees which lined the streets of my home-village twenty miles away were so badly injured that, to me, the streets never looked so beautiful again.

I have seen other ice storms but none so destructive as this one. The telephone company especially suffered, and I believe this catastrophe led to the immediate beginning of the project of putting all the wires underground. In our cities the placing of electrical wires in the earth is now almost complete, while in the country many cables containing large numbers of wires are either placed underground or are suspended in such a way that they can hardly be injured by an ice storm.

### Discovery of the X-Rays

The discovery of the X-Rays was made in 1895 by W. K. Rontgen, professor of physics in the University of Wurzburg, and was announced to the world in a ten page pamphlet with the title "Eine neue Art von Strahlen" (A new kind of rays), which was published at "Ende 1895". Two of my friends and former students, Frank B. Kenrick and Fred J. Alway, both B.A. in 1894, who were in Germany for post-graduate study and research in Chemistry, sent me a copy of the pamphlet from Heidelberg.

It was received during the last week in January 1896. On the evening of January 30 I read three or four pages and next day finished it. I showed the pamphlet to Dr. A. Kirschmann, who had been appointed Lecturer in Philosophy in the University in 1893. He was a thorough German man of science and we were on very friendly terms. He was especially well informed on psychological optics and we often discussed problems relating to that subject. We agreed to try some of Rontgen's experiments together.

Rontgen worked chiefly with Crookes tubes joined to a large induction coil. This type of vacuum tube had been devised by William Crookes, a noted English chemist. For a considerable number of years there had been much experimenting upon the sending of electric discharges through glass tubes containing gases of different kinds at various pressures. The experiments were beautiful to see, and much time and money had been devoted to the investigations. In after years some of the results were seen in the showy



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street signs seen everywhere, and more recently the subject of electronics has become enormously important.

In Crookes's researches he pushed the removal of the air or other gas from the tube so far that at last the nature of the electrical discharge through it was completely changed. He also had tubes of various shapes and sizes constructed, with electrodes in various locations and with objects of different kinds enclosed within the tubes.

Crookes found that when one of his tubes was operated by an induction coil there was projected from the cathode a beam of rays at right angles to its surface. These rays travelled in straight lines and when they struck the opposite inner surface of the tube, or various material placed in their path, these different substances would fluoresce—would brighten up, usually with glowing colours. These rays could cause a delicate wheel to rotate, and if converged upon a bit of platinum foil would melt it. Crookes contended that these rays were not composed of matter in an ordinary condition, that it was not solid, liquid or gaseous, but in a fourth state. He expressed his belief that the rays consisted of molecules charged with electricity and shot off with great velocity. The researches of J. J. Thompson of Cambridge led him to think of them as composed of charged atoms.

Crookes's tubes became famous and sets of them were added by many universities to their collections of scientific apparatus. When exhibited they always provided a beautiful and mysterious show. Just why Rontgen was using a Crookes tube when he made his great discovery he did not state. But he found that, while the cathode rays were confined within the tube, there was also some action outside the tube. From the area where the cathode rays bombarded the inner wall there seemed to spread out some new kind of radiation which, when it fell upon the substance bariumplatinocyanide and some other materials, caused them to fluoresce. Also, if it fell upon a photographic plate, even if wrapped in black paper or enclosed in a wooden plateholder, it would



fog the plate. However, if the plate was enclosed in lead foil the radiation did not fog it. Some substances were easily penetrated by the new radiation, others with difficulty or not at all.

On Monday, February 3, Kirschmann and I tried to obtain Rontgen's fluorescence effects. The induction coils in the Physics Department were not satisfactory for our purpose, one was too big and had an unsuitable interrupter, the other was too small. So I borrowed a more suitable one from Professor McKay of McMaster University. But we had no success.

On Tuesday, February 4, I arranged a bent piece of lead pipe in front of a photographic plate in a plateholder and operated a Crookes tube in front of it. Unsuccessful. I may say that some tubes were not effective for this purpose; also, I could not give much attention to the experiment as I was very busy with regular lectures and with the preparation for my public lecture on "Electric Waves" on Saturday, February 8.

On Wednesday, February 5, I asked W. W. Nichol, a fourth year M.&P. student to continue the experiments in the afternoon, but they did not seem successful. However on examining the first plate taken I remarked to Nichol that it showed the Rontgen effect, that at the corners where the wood of the plateholder was thick the action was not shown, but in other places the plate was fogged. But we did not see the shadow of the lead pipe which was what we specially looked for.

In the morning of Thursday I went over to the Chemistry Building to see if Professor Pike had succeeded in obtaining fluorescence with the Rontgen rays, but he had not; and in the afternoon I put Nichol at the experimenting again as I could not give any time to it. But no effect could be detected on the plate he took.

That evening, without my knowledge, my apparatus, including the borrowed coil was carried away over to another building, where three persons, one an expert in photography, with every facility at their hands, worked much of the night. Next morning



there was an announcement in the newspaper that some shadow-pictures had been made the night before by Rontgen's method. I believe longer exposures had been made and more pronounced effects obtained.

On Tuesday, February 11, I received a letter from S. C. Duncan-Clark, a resident of near-by St. George Street, asking if we could take a shadow-picture of the wrist of a woman of his family who had a splinter or something of that sort in it. The prospects for locating it were not good, but at my request she came to my office next morning (February 12), and we went over to the S.P.S. An exposure of 13 minutes (40 minutes in all, but resting the tube two-thirds of the time) was made, but on the developed plate no shadow of the foreign object could be detected.

A few days later a photograph was taken of the foot of a Toronto woman in which was a fragment of a steel needle. In this case a piece of metal was giving the trouble and in a picture of the foot a faint shadow of it was seen. A single half-inch-deep incision reached the end of the needle and it was successfully removed.

In the Canadian Engineer for January 1896 there was printed my paper on Electric Radiation, read before the Astronomical and Physical Society on November 26, 1895. This appeared there with the permission of the Society. The editor now asked me to write him an article on Rontgen's discovery. This I did and it was printed in the issue for March 1896 under the title, "The New Photography". At the end of the article I quoted the concluding paragraph of a lecture given April 4, 1879, before the Royal Institution in London by William Crookes when he first publicly exhibited the result of his investigations. It is as follows:

Of the practical applications that may arise out of these researches, it would now be premature to speak. It is rarely given to the discoverer of new facts to witness their immediate utilization. The ancients showed a perhaps unconscious sagacity when they selected the olive, one of the slowest growing trees, as the symbol of Minerva, the goddess of arts and industry. Nevertheless, I hold that careful, honest research will ultimately, even though in an indirect manner, draw after it, as Bacon said, "whole troops of practical applications".



In his brief publication mentioned above Rontgen gave a remarkably complete statement of the properties and evident uses of his newly-discovered X-ray tubes and in the manner of handling them has allowed wider application of his method—for instance, in detecting flaws in massive metal castings—but it seems to me their use in diagnosis in medicine, and especially in surgery, has been their greatest blessing to mankind.

### Optics-Writing a Text-book

In the whole wide range of Physics the field of Optics attracted me most strongly. For centuries natural philosophers had devoted much attention to it and their discoveries had led to some practical applications,—for instance, spectacles.

The two main divisions are (1) geometrical optics, (2) physical optics. The first deals chiefly with the reflection and refraction of the rays of light and their utilization in the microscope and the telescope. With the former we study small objects near at hand; with the latter, the heavenly bodies far off in the depths of space. The second division aims to determine the nature of light itself and from this the constitution of the sources from which the light comes, whether it be a flame in the laboratory or the sun and stars in the sky.

My ideas of reflection and refraction began to assume definite form as I pursued the elementary course in optics, which was taken also by other students in other departments; but not until I had reached the fourth year in M. and P. did I learn about interference, diffraction and polarization of light which subjects immediately confront one on entering the domain of physical optics. By a study of these effects I was ushered into a fairyland, wherein the actors were light-waves which in their contacts with each other as they moved among the molecules of various substances exhibited many scenes, beautiful in form and surpassingly brilliant in colour. I was fascinated with what I saw and with what I imagined to be taking place among the ultimate units of matter.



A year or two after my appointment on the staff in Physics it was arranged that I should have charge of the elementary course in physical optics which was required for honours in M. and P.

The text-book in the latter was in the French language. Indeed French physicists seemed to have a monopoly of text-books in this subject.

Fresnel (1788-1827) made noteworthy investigations into the nature of light, and it was largely through his work that the wave theory of light received general acceptance. Fizeau in 1849 was the first to measure experimentally the velocity of light; and Foucault, another Frenchman made great improvements in Fizeau's method of working. These three men, it seemed to me, possessed peculiar originality and skill in experimentation. As years went by, still further evidence of the validity of the wave theory was forthcoming. It was believed that a ray of light was simply the direction in which light waves were moving.

Hertz's experimental demonstration of the existence of electric waves, similar to light waves in all important features though much greater in wave-length was a further triumph for the wave theory.

When I entered the University no theory in physical science was more firmly established than the wave theory of light. It was in the same class as the atomic theory of matter and the Newtonian theory of gravitation.

Now if light spreads out by means of waves there must be a medium in which the waves are formed. In sound there are waves in the air; the ocean waves are produced in water; what are the light waves in? Thus we are led to believe in the existence of a medium filling all space to which the name the ether was given. Of course this was just a hypothesis which we compelled to make; and it was recognized as very desirable to secure separate definite experimental evidence of the presence of the ether; but experiments cleverly conceived and skilfully executed failed to give any evidence of the objective existence of this medium. Just when the physicist by hid



well-designed trap was about to capture it, it eluded him, there was nothing there!

For some years attempts were made to explain the amount of energy observed in different parts of the spectrum by means of the wave theory, but without success; and that led to the enunciation (1900) of the quantum theory according to which the energy is emitted by a hot body, not continuously by waves, but in little bundles, or quanta. Many phenomena (for instance, in photo-electricity) are explainable on this theory, but apparently not on the wave theory.

What does the physicist do in a case like this?. He must hold his hypothesis lightly, ready to discard them if they do not stand the test of experimental verification. But the wave theory is too solidly established to be simply torn out and cast aside. With increase in knowledge we shall learn how it can be reconciled with the quantum theory.

In the spring of 1896 I gave the third year a new series of elementary lectures on Physical Optics, which I was able to illustrate experimentally by means of the excellent apparatus possessed by the University. The preparation of these lectures gave me much pleasure and the students expressed appreciation of them.

Now there was no suitable text-book in English for such a course, and I discussed with my colleague W. J. Loudon the question of writing one. Later I conversed with my friend Kirschmann about it and it was proposed that we collaborate in the preparation of a 300-page book, of which I should write the text and he should supply the illustrations. He had assisted in the preparation of the noted treatise on psychology by Wundt under whom he studied and he very expert in drawing. He thought we could have it printed in German and also in English in Leipzig, to which place he intended to go in a few weeks.

It was clear in my mind what I wished to do and I began the task at once. I set out to read all the original publications of the men who had made the greatest contributions to the subject, as well as the chief <sup>t</sup>ext-books dealing with it, and



thus I expected to obtain a good understanding of how it was developed. I would then present my descriptions and explanations in simplest terms, giving occasional references to the historical and personal side of the discoveries.

On May 25 I had a talk with Mr. Loudon regarding the work, and he advised me to carry it out alone and have it published in America; also, just at this time, in conversation with A. C. Casselman, the drawing master at the Provincial Normal School, he asserted that an author should draw his own diagrams, and he offered to assist me to do mine. Kirschmann was quite agreeable to whatever I thought best.

On May 25 I wrote part of chapter I, entitled "The Nature of Light", and from that time I used every available hour in reading books and papers on the subject, in thinking out the best form to present my ideas, and then in writing them down. I drew my diagrams in pencil alongside the text, and, later, in india ink as copy for the engraver.

As the weeks passed the magnitude of the work I had undertaken was revealed to me, but I did not falter. At the end, to make the book complete, I included an account of electric waves, of the X-rays and also of the Becquerel radiation, just discovered, which led directly to the investigation by the Curies into radioactivity.

On December 14, 1897, I sent the Ms. to the head of a publishing house in New York, along with a letter stating what I had attempted to do. On January 6, 1898, came a disappointing reply--that the firm's "reader" had carefully examined the Ms. and thought the demand for the book would not be large enough to warrant the firm in offering to publish it. I replied I was anxious to use the work as a text-book and asked if they would take it if I gave them a guarantee. On January 13 came another letter from the head of the firm who quoted their "reader" as stating that the chief defect was the literary style--that it was not suited to a popular account! He said also that a few errors had been observed. I hardly expected that. I thought I had



precise and intelligible, and believed I had not made any errors.

Next day I consulted my colleague Loudon and read to him the second letter. He said the "reader" was simply trying his hand at "roasting" me. He offered to read my Ms. carefully and to criticise it "without fear or flinching", and this he did in the next few weeks. He reported that the faults charged against me did not exist. He made a number of suggestions which I accepted, but I did not have time then to revise the text as I was leaving shortly to spend six months abroad. During the next session, 1898-99, I made the revision. When finally the Ms. comprised 600 handwritten pages and over 200 drawings. On May 23, 1899, I sent it again to the same New York firm. This time their "readers" spoke highly of the work, but they did not recommend the firm to offer to publish it as they thought the demand for the book would be small.

A few weeks later I submitted the Ms. to another United States firm, and one of the partners actually came to Toronto to discuss the matter with me. He was pleased with the work but feared the demand for it would not warrant the publication of it by the firm. The book was never printed.

Was my long and strenuous labour in preparing the text and my wearisome slaving in drawing the diagrams all for nought? Far from it!

This experience was of decided value to me when, some years later, I was engaged in the preparation of other books and papers. Also, in performing my self-imposed task I obtained a familiarity with the developement of the whole science of optics which was of great advantage to me in teaching the subject. Again, there was a reward in the discipline demanded in carrying out a big undertaking. Indeed my whole course through the University was to me a lesson in persistence in effort and in the endeavour to do well what one undertakes.







## VIII.    Trip to Germany

### Getting Ready

After five years on the staff of the University, during which time I studied hard to become more effective in my work, I thought it would be of decided value to take a trip abroad. Indeed that was quite the ordinary thing to do. Every year both students and instructors went over to France, Germany or some other country to devote months, perhaps years, to study. Largely through association with my friend Kirschmann, I was better informed on conditions in Germany, particularly in Leipzig, and to that place I intended to go.

On making inquiries around the University I found that Adam Carruthers and Ross G. Murison had inclinations similar to my own. They also proposed to go to Germany. Carruthers graduated in 1880—ten years before me—with the gold medal in Classics. He taught in a high school, became a lawyer, taught again, and finally was appointed Lecturer in Greek in University College. Murison received his B.A. in 1893, studied for the Presbyterian ministry and became Lecturer in Oriental languages in University College. The result of our conversations together and our inquiries at travel agencies was an agreement to sail on the North German Lloyd ship Friedrich der Grosse on April 7 for Bremen. Carruthers was married and had four children. I had been married on June 20, 1894, and a child was born in May 1895. Carruthers and I would travel alone. Murison had a young wife who would accompany him. He was headed for Breslau where he wished to study cuneiform inscriptions. He was continually puzzling out those remarkable symbols.

I did not expect to be in Germany long enough to make an original research into some problem in physics; but by attending lectures and visiting different parts of the country I hoped to improve my knowledge of the language and of the life of the people. At the end of May my wife was to sail with her father for England to visit his six brothers and one sister, and I was to join her after the German University term was ended.



In his university lectures Carruthers laid stress on Greek archaeology, and he proposed to take a course in that subject given at the University of Leipzig by the distinguished William Dorpfeld, who, after 1882, had actually worked with Schliemann in his excavations.

As there would be four in our party we decided to be economical and to travel second cabin. The fare from New York (Hoboken) to Bremen was \$42.50, which was \$37.50 less than the lowest first class fare at that time of the year. We had also learned that the second class fares on the Kaiser Wilhelm der Grasse, the German pride of the ocean, were \$45, \$50 and \$60, and the date of its sailing was April 12. (Both of these ships were sunk during the First War).

On Friday, April 1, my family moved out of 124 Yorkville Avenue, which was our first home. We had lived there for four years and we left it with regret. I stored my books and my tall clock in a room in the basement of the Main Building, and the rest of the furnishings went to a storage warehouse.

#### On Board Ship

On Wednesday, April 6, at 4:30 p.m., I left the Union Station, Toronto, after saying good-by to my wife and her mother who had come down to wish me a good voyage. Carruthers got on the train at Parkdale—and we were off for our "ocean trip". We went by way of Hamilton and Welland and arrived at Buffalo at 7:15. At 8:00 we took the sleeping car, which was warm, and we slept comfortably.

Next morning at 7:15 we reached Hoboken, and after breakfast at a restaurant we went on board the Friedrich der Grosse. The Kaiser Wilhelm der Grosse was at a near-by berth and its band played good music during the morning. We were told that she had a gross tonnage of 14,350 and a speed of 23 knots and we admired her. Our ship left her dock at 12:12, and soon after passing the Statue of Liberty we went down for dinner—a good one with five or six courses.



There were about twenty second-cabin passengers, nearly all able to speak German. Our stateroom was not very large but quite comfortable. The ship was large-about 10,000 tons, I believe-and she had a big cargo, much of it being raw cotton, and she moved steadily forward at about 14 knots. We had the usual plentiful offering of meals. At 6a.m., coffee and rolls; 8, breakfast; 10, bouillon or tea; 12, dinner; 3, tea or coffee, and bread; 7, supper. From the beginning two young women from the first cabin associated with us much of the time-Miss Jones of Ohio, going to London for vocal lessons; and Miss Berner of Kansas, bound for Leipzig to study the violin.

Friday was fine, but on Saturday a storm developed, with waves 10 to 15 feet high, sometimes splashing over the deck. On that evening there was a dance in the steerage. The sailors played an accordion, a triangle, a tambourine and big and little drums. There was a general happy time. That night my rest was disturbed by something being violently knocked about. It sounded like a big horse 'stomping' in its stall. I found it was the rudder-post being knocked back-and-forth by the big waves of the storm.

Next day was Easter Sunday and it was ushered in by a glorious sunrise. At 11 o'clock a number of the passengers gathered in a First Class Dining Room and Murison conducted a religious service. One of the passengers, Miss Moira C. Portmann, played the piano, and we sang three hymns,-an Easter Hymn, Onward, Christian Soldiers! and Nearer My God to Thee -all out of the "Presbyterian Book of Praise". Then Murison gave an appropriate address on "He is not here: for he is risen". Among us was an old soldier from the steerage, dressed in very decent blue clothes, with his medal on his breast. The sea was pleasantly smooth and at noon we had gone 988 miles.

On the morning of Monday, April 11, rain fell, and after it followed a stiff north-west breeze which dashed the waves upon the lower promenade deck. At the evening meal the vessel swayed so that the tumblers slid along the table,



but by this time we were accustomed to the ship's motion and suffered no nausea. That afternoon we played "shovel-board" and had a pleasant time. That was my introduction to the game.

The storm continued over Tuesday and we began to long to have our ship tied up safely to solid land again; and during the unpleasant weather on Wednesday I kept under shelter reading "Quo Vadis?" which had been loaned to me. Its minute delineation of people and their motives reminded me again of George Eliot.

As we were well along on our voyage Carruthers and I asked the Purser to give us German money in exchange for our Canadian currency. For \$39.50 I received 162 Marks, which was at the rate of 4.10 Marks for \$1. The Purser had no paper money and I had to take it in gold and silver coins.

Thursday, April 14, was fine throughout and I divided my time between "Quo Vadis?" and shovel-board with Carruthers. Friday also was a beautiful day and the ship was very steady-never a quiver!

On Saturday morning when we came on deck there was the pleasing sight of land ahead. The Lizard was reached at 8a.m. and we signalled to shore to have a tender come out from Southampton to meet our ship; and as the ship moved steadily eastward we sat on the deck and viewed hour after hour the south shore of England.

The Channel, famous for its uncomfortable storms, had scarcely a ripple on its surface. Off Plymouth we saw about 100 fishing-boats and two gun-boats. Later, we met the two American liners St. Louis and New York, bound for the United States. The first was due to sail this day, but the other was scheduled for a week later. They had started homewards on account of rumours of war. Indeed before we left home there was talk of war between the United States and Spain, but such an event was hardly in our thoughts. One of our passengers stated his belief that it would be only Mund-krieg (mouth-war) and all seemed



to agree. But two weeks later, on May 2, there was a heavy action in the Philippines in which the United States was entirely victorious! I found that, with the exception of Great Britain, the sentiment in Europe was in favour of Spain.

At 7 p.m. we dropped anchor off Southampton and a snappy little steamboat, Her Majesty, came out to our side, taking off some passengers (including our friend Miss Jones) and bringing several for our ship. We stayed on deck until 9:30 p.m., watching the south shore of England, including the Needles and the Isle of Wight, and regretted that darkness blotted out the rest of it.

Next morning we were in the cold, grey North Sea. Actually we arrived about ten miles off our haven at 4 a.m. and anchored in forty feet of water. Then, as the tide rose (full at 11 o'clock), we went in at a walk and reached the dock at Bremerhavn at 10 o'clock. We had our baggage examined, and at about 11:15 left on a special train for Bremen (30 mi.), which we reached at 12:50; and as our train for Leipzig (241 mi.) was to leave at 1:13 we hustled to check our trunks, but it was too late to have them put on our train.

#### In Leipzig: Getting Settled

We ran along the platform until we came to a second class compartment in which were two men. "Second class?" I called out, and then quickly, "Zweite Klasse?" A voice at the far end said, "Second Class? Yes!" We were delighted to hear the answer in English. Its owner was E. C. Averett, a leaf-tobacco merchant of Danville, Virginia, U.S.A., who was in Europe on business. Later, at Hannover a young engineer named Joseph Rensing, who lived at Leutsch, a suburb of Leipzig, entered our compartment. He spoke English pretty freely and the four of us had an agreeable time. Our route lay through Braunschweig, Magdeburg and Halle, and we got to Leipzig at 9:58 p.m., in a rainstorm. Averett and Rensing went to Hotel Sedan, and we went to Hentschel's Hotel, which had been recommended by Dr. F. G. Smale of the department of Chemistry, U. of T. We were given a nice room on the third floor and had a good rest, although we did not like a feather bed above us as well as one under us.



We wakened next morning, with a dull sky over us still. We felt lonesome and far away, and went down to breakfast. Each of us had coffee, rolls and 2 eggs. The bill was made out in my name and was as follows:

TAGES/NOTA für Herrn Chant

|      |                         |     |     |
|------|-------------------------|-----|-----|
| 18/4 |                         | Mk. | pf. |
| 19/4 | 2 Logis (lodgings)..... | 5   |     |
|      | 2 Cafeis complet.....   | 2   |     |
|      | 4 Eier.....             |     | 60  |
|      |                         | 7   | 60  |

In Canadian currency, \$1.81

The food was good and service efficient.

We then set out to find a lodging place. First we called on Frau Bettermann, in whose house my friend W. S. W. McLay of McMaster University had lived. He had given me a message for her which she was very pleased to receive; but she had rented her last room the day before!

Then we went to see Frau Planert, a neighbour. Now across the street from my house in Toronto there lived an old physician named McCausland. His daughter married a German named Frind, and their two little boys, Otto and Arno, had been sent to live for some with Frau Planert in Leipzig. She received us very kindly (in German), and we learned that there were some vacancies in the downstairs apartment. So we went down to see Frau König, the lady of the house. She rented a single room for the two of us to occupy until May 1, on which date we could have a large study room with two single bed-rooms off it. I forget the price we paid but a week or so later I was told that it was "fürchtbar zu viel" (Frightfully too high). As we were Amerikaner we must have heaps of money.

Having made this arrangement we felt more settled in mind. We had dinner at the big round Panorama Restaurant, with the cyclorama picture of the Battle of Leipzig upstairs. We found seats at a convenient table but we were somewhat bewildered with the extensive Speisekarte. The keen-eyed Oberkellner noticed this and came to our rescue. He translated some of the names of the dishes, and pointed out a special lunch for 1½ Marks which we took. There were six articles and everything was "good to take".



On that day we went there also for evening meal which cost one mark plus tips in both cases.

As the day was cool we had a fire made in the Berliner stove in our room. It was like a brick chimney coated on the outside with white enamel. A fire was built within it and allowed to burn itself out. This heated the whole structure and kept the room comfortable for hours.

During the afternoon we went to the Bahnhof (station) to inquire for our trunks, but they had not arrived; however they were there next day (Wed. April 20). They had been forwarded by express; Carruthers had to pay 4.70 marks and I, 7.40 marks. In America they would have been checked through free. Then a Dienstmann (service-man) brought them up on a hand-cart for which we paid 2.50 marks. I decided to do without a trunk in Germany next time.

Saturday, April 23, was the 70th anniversary of the birth of Albert, and this was also the 25th year of his reign. This double jubilee was celebrated by fine street and window decorations and by fire-works set off from the old Pleissenburg Tower which dated from about 1550 and was a part of the original fortifications. These were very good but they were set off very slowly. To us the most noticeable feature of the celebration was the lack of enthusiasm. Probably 100,000 persons were gathered in the public square, but not an outburst of enthusiasm or mischief! They were well-behaved, well-drilled,--and kindly people!

For centuries there had been held in Leipzig important Fairs and when we arrived the Easter "Messe" or Fair was going strong. At many stalls and tables articles of various kinds were sold. Many people attended and the amusement side was not neglected. The merry-go-rounds, especially the "Elektrische Grottenbahn" (a railway running through a darkened grotto) did a rushing business. I noted that these



were patronized largely by adults, not by children as at home!

### Enrolling at the University

On Monday, April 25, in a drizzling rain, we went up to the University to enrol, but we were not allowed to do so because we did not have passports. We had been assured by our travel agency in Toronto that we could get along without passports. So in the afternoon we called at the office of the British Consul and explained to him that we had not been accepted at the University as we did not have passports. "Oh!" he remarked in apparent surprise. Then he wrote out a certificate for each of us which stated that we were British Citizens. "This", he said with dignity, "will be sufficient".

On Tuesday, April 26, I got up at 6.20, had Kaffee" from our landlady, and just before 7 o'clock went up to the Physics Building to take my first lecture with Professor Paul Drude. There were 37 present. Drude was a young man of 35, about 5ft. 7 inches high, with blue eyes, round face and moustache. He was dressed in a plain brownish sack coat buttoned up, and he wore no gown. As he entered the room the men gently "tramped" a welcome; and, without ceremony, he at once started to explain the divisions of Optik, and then to discourse on the Law of Snellius (law of refraction). He talked rather fast and in disjointed phrases, much as we did in Toronto, and I was able to get the substance of almost every sentence. I was quite pleased with the experience.

Drude rode a bicycle to his work. He gave four lectures a week on Optics at 7 a.m., and one on Elektrotechnik at 6 p.m. The latter included the new subject of wireless telegraphy and many technical persons from "downtown" were enrolled in it—some 130 in all. As a matter of fact I preferred the early morning hour; by six o'clock I was tired and hungry. Towards the end of the semester I called on Drude to get him to sign my attendance book. He wanted to know if I could understand him. I told him he talked etwas schnell. He seemed quite free and friendly, and



I was amused to see him busily munching the lemmchen in his right hand and vigorously asking questions all the time, while he used his left hand to shake hands with me. He remarked that he had seen me at the lectures, but the conversation went no further.

Drude wrote a book embodying these lectures which he entitled "Lehrbuch der Optik". It was afterwards translated into English and called "Theory of Optics". I used it as a text book in the U. of T.

Drude was at Leipzig 1894-1900, then at Giessen until 1905, when he attained the high honour of professor at Berlin, but, to the regret of the scientific world, he committed suicide on July 5th, 1906.

This Tuesday was a moderately fair day, the only passable day since our arrival. In the afternoon we walked out to the field of the Volkerschlacht of Oct. 16-19, 1813, when Napoleon received a serious defeat. A monument, known as Napoleonstein, marks the place where Napoleon stood to watch the battle.

While on this walk we observed a painful sight. A bare-headed poorly-dressed woman was pushing an old baby carriage with a covered-up parcel in it. Through a hole in the covering we saw the parcel to be a small coffin, about three feet long, which she apparently was taking out to the Süd Friedhof (south cemetery). Not long afterwards we saw her returning but the carriage was empty. Without doubt there was a dead body in the parcel and we thought it a pitiable scene.

On Wednesday afternoon, accompanied by a clerk from the bookstore of Gustav Fock, we went to the University again, and this time we received our Scheine (cards) to permit us to be formally enrolled as students. Next day at 8.30 a.m. we went to the Sekretariat of the University and presented our diplomas and other documents. We were given duly signed certificates, but we had still to be received by the Kansler and the Rektor. While in this office the Secretary asked us if Toronto was in Süd Amerika and the clerk put U.S.A. after it.

This evening a letter came from the University Pedell (beadle) instructing us to call to see the Kansler between 9 and 12 next morning, which of course we did.



A man in the office who could speak English took charge of us and stayed with us until all the formalities (but one) were completed. We went back at 3.45p.m. and received our formal large certificates from the Rector as he shook hands with us. He seemed pleased when he reached our names and on the second attempt he came very close to the correct pronunciation. He asked if they were correct. Carruthers spoke his name, and I said "Yes, sir!" in English.

The sunshine now seemed to be overcoming the persistent overcast sky and the first week of May was very cheering. It drove away the 'colds' which seemed to haunt us. On the 2nd of the month when at the Panorama Restaurant a waiter brought us The Times of London to read and thus we learned of the decisive engagement between the Americans and the Spanish in the Philippines.

Of course all this time Carruthers and I were studying the German language. We worked our exercises in the Grammar, conversed with the women of our house, with Frau Bettermann and with any others we met, and also we were reading together a pleasing story by Hauff entitled "Die Bettlerin vom Pont des Arts" (The beggar-girl from the Pont des Arts, a bridge in Paris). It went slowly at first but in time we became quite interested in the characters. One day we noticed in the window of an art store on Goethe Street some pictures of a beautiful girl and the subject was "Die Bettlerin vom Pont des Arts". They were photographs of a picture painted apparently by G. Schauer. It pleased us anyway. Carruthers bought a cabinet-size photograph for 1 mark, while I paid 5 marks for a superior photographe, 8 X 10 inches, and it has hung on the wall of my home ever since.

For the same purpose I attended the lectures of Gustav Wiedemann, the kindly old professor of Physics, who lectured on elementary physics each day at 11 o'clock. He had a class of 120, one being a lady. I was familiar with his subject and he showed many simple experiments and I could follow him easily.



Among other books, I read Ibsen's "Hedda Gabler" and "Gespenster" (in German of course). I thought them cynical and powerful, but they left an impression of moral dirt. In addition I subscribed for the daily newspaper, Die Leipzigen Neueste Nachrichten (The Leipzig latest News). The cost was 65pf. (16 cents) a month.

Occasionally I "shopped round" the other professors. Twice I went to hear Lie, the great Norwegian mathematician. He was lecturing on Analytical Geometry. and on my first visit he was discussing the general equation to the straight line. He was a good lecturer and moved freely among the students and talked with them. There were about 25 in his class. On my second visit, early in the lecture his collar was uncomfortable, probably unbuttoned, and he simply pulled it off and laid collar and tie on a shelf. There was a slight motion of the feet, but he went on quite unconcerned as though this was a regular part of the day's performance.

Another day I went to hear Carl Newman (1832-1925) whom Kirschmann had described to me. He had produced some researches of importance but in the distant past. He was lecturing on Analytical Mechanics, but he talked in a low voice and mumbled his words in his toothless mouth and I could not understand anything he said.

Then on July 4, in company with J. W. Baird, '97 U. of T., I went at 5p.m. to hear Wilhelm Wundt (1832-1920) lecture on Physiological Psychology. He had a large class and lectured in a convincing way. He drew a diagram of the tongue, and said that at the upper end it is very sensitive to sweet, at the sides to sour and at the back to bitter.

I noted that Baird was at Drude's lecture on aberration on May 13. He arrived in Leipzig on April 23 and was working very hard, actually trying to take notes of lectures in German. On May 18 he came to call on us and we showed him the Toronto Globe for May 7 and 9. He turned to the Baseball news and read it eagerly. He said he was at every major math. <sup>match</sup> in the previous year!



On the evening of May 11 Carruthers and I had a great treat. We went to the Neues Leipziger Stadt-Theater to hear Wagner's Die Meistersinger von Nurnberg. The performance lasted from 6 p.m. until 10-53, with 15 minutes intermission between the three acts, and it was all excellent. We had German texts of the words and could follow the action quite well. My seat was II. Parquet Links, No. 303, and we were pleased to find ourselves near to a big company of English-speaking people. I forget the price of the tickets but they were quite inexpensive.

Another concert pleased us greatly. The outstanding Viennese orchestra of Eduard Strauss, (son of Johann of "Blue Danube" fame) gave four concerts in the Stablisement Bonorand-big Bier Garten on the edge of the beautiful Rosenthal Park. We went on Monday, June 13. Tickets were 1 mark at the garden but 75pf. if purchased previously. One place at which they could be bought was at a music store on Neumarkt. We had forgotten the name and number but at last we recognized it-the name was Lichtenberger. We went in a passageway, then wound about upstairs and at last got into a single room where there were many boxes and shelves. It was dimly lighted and we thought it strange that this should be chosen one of the places to sell tickets. However we got them and in the evening went to the Garden. I suppose there were 1000 people there and the band played beautifully. On the programme there were four of Eduard Strauss' compositions and two of Johann's and the band rendered Paderewski's Minuet and Mendelssohn's Lied ohne Worte exquisitely. We went at 8 and stayed until 11, all for 18 cents. Of course everybody drank beer and I suppose there was much profit from it. When I announced that I was going to Germany I was urged to drink beer, the universal beverage, and was advised to ask for Lowenbrau, a mild type, but I never could enjoy it-it made me bilious, but not bibulous. This evening I kept a glass on the table in front of me, sipping it sparingly, and a waiter was all the time hovering about to bring me noch ein.



### The City of Leipzig

The city of Leipzig lies on an extensive plain and within its borders flow three small sluggish rivers. It dates from about 1100 A.D. and through the centuries it grew in importance commercially. Its University was founded in 1409 and developed into one of the greatest in Europe. Both in the city and in the country the whole atmosphere was different from that in Canada. In the fields we saw roses grown for the manufacture of perfume; in the city were many signs strange to me. Every place was full of history.

In 1898 Leipzig, including its more modern suburbs, had a population of 430,000. (Toronto in 1900, 288,000; in 1910, 424,000). In the interior of the old city there were many lofty and closely built houses with high pitched roofs. The shops also were crowded together upon narrow and crooked streets. I suppose this was in order to be near the fortifications. When the latter were removed fine promenades and squares were laid out and before I arrived many large and imposing buildings had been erected. I recall the New University and the New Theatre on Augustus Platz, the Imperial Supreme Court, the City and Grassi Museums, The Royal Conservatory of Music; Peter, Luther and Thomas Churches; Booksellers Headquarters; Luther and Mendelssohn Monuments. They were generally of massive construction with many elaborate decorations and finished perfectly in every detail. There was nothing in Toronto like it. Just what the city had grown to at the time of the Second World War I do not know, but whenever I heard of great air-planes going over to drop bombs on Leipzig I feared that some of those magnificent buildings might be destroyed.

But while within the old city limits the buildings are closely packed together so as to utilize every square foot of land, one need not walk in almost any direction for more than fifteen minutes in order to reach wide meadows and pleasant woods, with well-built roads and winding by-paths.

Perhaps the finest of these open spaces was the Rosenthal (valley of roses).



The Elster river went along its south-west edge and at its east end was the Zoological Gardens, near which were the Pleisse and Parthe rivers. In prominent positions were statues of several distinguished men and, above all, there were numerous eating and drinking places,--as well as some places where good music could be heard.

The opening day of the week-long Schutzenfest was Sunday, July 3, and a grand procession marched through the city streets. There were representatives of "huntmen" and old sportsmen of several centuries, with their green costumes, their cross-bows and other equipment. The Vereins or "unions" marched in full strength, as they do on our own big national occasions. The mounted knights made a great show and the waving banners were very picturesque. The procession took three-quarters of an hour to pass and they marched out through the Rosenthal to the Schutzenhof near Leutsch. Two weeks later, on July 17, Carruthers and I went for a long walk in the Rosenthal, going as far as the Schutzenhof where the fest had been held. There a big crowd was gathered drinking beer, coffee, milk, selter-wasser, and such, and many were shooting at the targets. This was a sample of the wide-open continental Sunday which did not commend itself to us.

On another afternoon we went for a walk to the woods to the south of the city. We went through the Scheibenholtz (quoits-wood), past the Racetrack, and then along the path beside the river Pleisse until we came to the restaurant built on piles--Pfahl Restaurant. Here was a ferry and the notice above it was:

Umsonst und Sicher!  
Das hinuber wollende Publicum wird  
gebetet zu rufen "Hol uber!"

This I thought an excellent example of how in German sentence the words are inflected and closely packed together and finally come to a sudden dead-stop. I should translate this somewhat as follows:

Free and Safe!  
The over-here wishing-to-come public is  
begged to call out "Pull over!"



The boat was pulled over by grasping a rope stretched across the river.

Here we cut through the woods to Connewitz and came home by Sud Strasse. We had to walk all the way because every north-bound street car had its full number of passengers and the notice "Besetzt" was displayed. No amount of waving of the arms would halt the car. Of course we had similar experience in other European cities.

Friday, June 24, (Midsummer Day) was Johannisfest, and it was the custom to decorate the graves on that day. I went to Johannis Friedhof twice. A great crowd of people outside the cemetery gates were selling flowers, wreaths, and other decorations; and of course there was the inevitable wurst and brodchen vendors. This day is known in the province of Quebec as Saint-Jean Baptiste day and four years previously my wife and I were in Quebec city on our wedding trip. The procession there had many amusing features.

#### Visit to Lutzen

Another important expedition was to the spot where Gustavus Adolphus, King of Sweden, fell in 1632. From childhood I had a somewhat idle curiosity about that name since the nicknames which were indiscriminately attached to me were Gustavus Adolphus and Caesar Augustus. My travelling companion however was a profound student of history and he proposed that we make a pilgrimage to the place where the valiant defender of Protestantism gave his life. It was about twelve miles south-west from our house on Bauhof Strasse, in the middle of old Leipzig, and the date chosen was July 7.

The weather was not promising but, carrying our umbrellas and my camera, we started at 8.45 a.m. by taking the city electric car to Lindenau, where we began our tramp on the chaussee, or high road. We passed through Schonau and Markranstadt and at last came to Schwedenstein, which is a short distance from Lutzen. We arrived about twelve thirty. Along our good road cherry trees had been planted by the authorities and at this date the fruit was ripe. The fruit on the trees had been sold by auction and men were picking it.



Going over to one man I asked, "Verkaufen sie Kirschen?" "Ja, wohl!" he replied. "Bitte, fünf und zwanzig Pfennigswert", and he put up 6 cents worth in a paper carnucopia which he made, and we ate them as we went forward. Cherries, plums and other fruit planted along the highway seemed unmolested.

At the end of our 8-mile walk we were hungry and went to the near-by eating place. They had bier and limonade to drink, and for eating we got Butter-brod mit Schinken. The butter was good, the bread was hard brown stuff in big 'hunks', and the ham was sort-of half dried and half smoked. It was all quite palatable and well suited for our return walk.

The mnoument, as we saw it, consisted of a block of granite with a painted cast-iron canopy of gothic pattern above it. It was erected Nov. 6, 1837. Upo \_n one face of the stone was inscribed "Here fell Gustavus Adolphus on Nov. 6, 1632"; and on the other three sides were quotations from the Bible: 1 John V l.c. 4, 1 Sam XXV, l.c. 28; 1 Tim. I, 7.

Upon the building in which we had our lunch was the inscription:

Zum Andenken  
an den Heldenkonig  
Gustav Adolph  
Zur Feier des 300-jahr. Geburtotages  
Am 9 Dec. 1894  
-----  
Ist Got mit uns  
Wer mag wider uns sein

(To the memory of the hero-king Gustavus Adolphus, upon the celebration of his 300th birthday on Dec 9, 1894. If God be with us, who can be against us?)

We visited the museum, which contained picutres and documents, swords and other interesting objects connected with the famous and revered King who "fell here in the fight for the freedom of the spirit".

We retraced our steps to Lindenau and reached home at 5.15 p.m. A memorable day!

#### Trip to Berlin

I was surprised to find Pfingstmontag (Whitmonday) so fully observed in Germany. There were no lectures at the University on that day nor for the rest



of the week. Most of the students were out of the city. Indeed I noticed a week-day holiday was much better observed than was Sunday. On the former the streets were very quiet and the stores, even the bakeshops, were closed much of the time, while on the latter the bakeshops were open nearly all day and late into the evening. Some other stores also were open for business.

We decided to go to Berlin on Tuesday (May 31) and so went to bed early the night before, ordering our coffee for 7.45 ( or  $\frac{3}{4}$ 8, as it was often written). Having disposed of it, we took the street-car to the Berliner Bahnhof and boarded the train which left at 8.50. The return fare (3rd class) was Mk. 9.80; single, Mk. 7.70. The cars, of course, were not luxurious but the service was good. We made the 101 miles in three hours, stopping on the way at Bitterfeld, Wittenberg and Jutebog. At the Berlin station we were met by M.F. Libby, who formerly taught in the Parkdale C.I., as had Carruthers, and we went with him to his pension at Grossbeeren Str. 94 III.

We had dinner soon after 12 o'clock and then Libby, Carruthers, Herr Su-en, a Chinaman attached as English interpreter to the Chinese Legation, and I went out to Potsdam, 17 miles south-west. Herr Su-en wore a blue silk coat and a long queue, and the people stared at him. However he quietly smoked a cigar and seemed unperturbed.

There were many interesting things to see, of which the Sans Souci Palace was the most famous. It is of one story and was erected in 1745-47 for Frederick the Great. There he lived almost constantly and there he died in 1786. Many of his personal possessions were there, arranged as he left them. One of his famous companions was Voltaire, and the room which he once occupied was kept unchanged. The New Palace is at the west end of Sans Souci Park, about a mile away, and we walked through the grounds surrounding it. I had my camera and had made three exposures, when a policeman came after me. He vigorously insisted that taking photographs was not allowed. I pretended that I did not understand all he said



-which was true-and he finally let me go. I still have photographs of the Sans Souci Palace, the Old Windmill and the Fountain.

Next day we went through the Reichstagsgebäude (Imperial parliament building), a massive and handsome structure built in 1884-94. Also we visited the Old and the New Museum. The objects which interested me most were some relics from ancient Pergamos. In the afternoon we went to the recently established Kunstausstellung (art exhibition). At that time, I believe, this exhibition was regarded disdainfully by some critics in high circles. There were many impressionist pictures which did not please me but some very attractive ones too. Once more we had to walk home as all the street-cars were besetzt.

Next day (Thur. June 2) we went out to Charlottenburg, a new westerly suburb, going by a storage-battery electric car as poles and trolley wires were not allowed to deface the landscape there. We went past the Royal Palace, just south of which is the monumental Neptune Fountain, and entered the street Unter den Linden, which is about a mile long. At its west end we passed through the Brandenburg Gate and then continued along the Charlottenburg Chaussee which runs centrally through the Tiergarten. On emerging from this beautiful park and entering Charlottenburg the street bears the name Berliner Strasse. Right here are the Royal Porcelain Factory and the Technical High School, and, a short distance farther on, is the Reichsanstalt, the famous National Research Institution. When new buildings were provided for it in 1888 Helmholtz was made director.

Now I considered Helmholtz the greatest of German scientists, almost equally distinguished in physiology, physics and mathematics. I was well acquainted with his incomparable "Physiological Optics" and "Sensations of Tone", and while in his country I was improving my knowledge of German by reading his Vorlesungen (lectures) which were just being published. On the occasion of the Columbian Exhibition at Chicago in 1893 there was an International Electrical Congress and Helmholtz (then



aged 78) was an official delegate and was chosen chairman. I have a group photograph of the official delegates. When on board ship returning home he fell and suffered an injury from which I believe he never fully recovered. He died on Sept. 8, 1894. Baedeker's "Northern Germany" states that he was buried in Lutzow Cemetery, which is not far from the Reichsanstalt. I was anxious to visit the cemetery and photograph the stone which marked his grave. We searched a considerable time for it but found only a small plot containing four or five graves; and none of the people around knew anything about Helmholtz! Regretfully we returned home without achieving our end.

We left Berlin at 3.50 p.m. and reached Leipzig at 7 o'clock.



### Trip to Dresden: Other Students

Another side-trip which we took was to Dresden, the capital of the kingdom of Saxony. In planning this trip we had the advice of W. D. Coolidge, one of our American student friends, who had been over the ground. Coolidge came from Hudson, Mass., and was a graduate of M.I.T. I was much interested in the problem he was working on. It was to determine the value of K (the dielectric constant) for liquids by the use of electric waves excited in wires by means of a Tesla coil. This research had been suggested by Drude. He had been in Leipzig eleven months, and he obtained the Ph.D. degree the following year. Some years later Coolidge joined the staff of the G. E. Research Laboratory at Schenectady, N.Y. and he became its Director in 1931. Perhaps his best known achievements are the production of ductile tungsten as it is used in electric light bulbs, and the design and construction of the Coolidge Tube, famous for its efficiency in generating X-rays.

Another student was Wendell, who was on the staff of the M.I.T. He was carrying on a research under Wiedemann and he passed his Ph.D. examination in July just before I left, summa cum laude. He invited me to call on him at the M.I.T. This I was able to do two years later,--on both him and Coolidge.

A third American student was Eugene C. Sullivan, who came from Elgin, Ill. I met him at one of Wiedeburg's lectures. He obtained the Ph.D. degree in 1899. He joined the Corning Glass Works and after numerous promotions became Director of Research in 1937. He was present at the pouring of the 2½-ton disc of "Pyrex" glass for the great mirror of the 74-inch telescope of the David Dunlap Observatory on June 21, 1933.

I may mention also a New Zealand man named Erskine, who had been awarded an 1851 Exhibition Scholarship, and who had been in Berlin and Leipzig for over two years.

Saturday, June 18, was a fine day and at 8.26 a.m. Carruthers and I left



for Dresden, which is south-east of Leipzig. We went by Schnellzug(rapid-train) and travelled the 71 miles in two hours. We went at once to the Hotel Stadt Coblenz, which had been recommended to us, and secured a double room for Mk. 3.50.

Then we hastened back to the station and purchased tickets for Tetschen, which was only 39 miles away, but in Bohemia, which was in Austria then. We covered the distance in 1 hr. 14 min., arriving at 12.39 p.m. The ride was very picturesque and the town very old-world and odd. It is built on the eternal rock, with crooked streets, and with mountainous bluffs and valleys on every side. We were impressed with its rugged and striking appearance.

We had lunch at Josef Hofmann's Pilsner Bierstube. Josef was courteous and attentive to his foreign guests and his food was reasonable yet good. The Nota (bill) for each of us was:

|                       |             |
|-----------------------|-------------|
| Pilsner-----          | 22          |
| Rumsteak-----         | 1.00        |
| Kartoffeln-----       | 10          |
| Kaiserschmarrn-----   | 60          |
| Bratzen-----          | 10          |
| <del>1.00</del> ----- |             |
|                       | 2.02 Kroner |

For the two of us, this was Kr. 4.04 = Mk. 3.48 = 83 cents.

At 3.30 we took ship down the River Elbe which is navigable for hundreds of miles by vessels of shallow draught. The trip was superb and restful. We lacked only the company of our wives on this five-hour voyage upon the historic Elbe, which name recalled lessons in geography in the public school. We got back to Dresden at 8.30 p.m.

#### Visit to the Picture Gallery; and to Meissen

Next morning we went to the famous Picture Gallery, which is housed in a building considered to be one of the finest examples of modern architecture. We secured Catalogues and although we spent all morning seeing its treasures we were able to examine only a few of them. First we viewed its chief glory, Raphael's Sistine Madonna. There are some pictures and some songs which do not require a trained expert to discover their greatness. This picture is of that class. It



has a charm and a mystery which only a master genius can produce. We are told that it was painted about 1515 and was purchased in 1753 by King Augustus III (1733-63) for £9,000. Its size is 8 ft. high by 6 ft. wide. There were really hundreds of masterpieces. One of the smaller gems was The Chocolate Girl. This had been made familiar by being reproduced in advertisements of a make of chocolate. I was pleased to see the original. It is a pastel by Jean-Etienne Listard (1720-1789). It is beautifully drawn and daintily coloured.

In the afternoon we strolled through the park to the east of the city, - one of the finest I have ever seen. This seemed a special place for nurse girls pushing stylish perambulators before them. Though the sun shone most of the time the air was cool, and these nurses, dressed in their uniforms entirely devoid of sleeves were evidently uncomfortable. Then, ploughing through the surface layer of the weel-kept lawn, almost with the speed of a ricocheting bullet, I saw a mole! Now we had a specimen of the star-nosed variety of these little rodents in a case of stuffed animals at my old home, but I had never seen one in action before, and indeed I did not do so again until 1934 on the grounds of the David Dunlap Observatory.

The following morning we again went to the Gallery. We paid special attention to the Raphael Madonna and purchased a few photographic prints, which included, besides the Madonna and the Chocolate Girl: - Guido Reni (1575-1642) Ecce Homs, Carlo Dolci (1616-1686) Half-Figure of the Saviour, and Murillo (1618-1682) Mary with the Child.

The Old Masters will never be superseded!

We left Dresden for Meissen, 16 miles away and also on the Elbe. This is a quaint old place, somewhat like Tetschen. It is built on the solid granite and there are great bluffs on each side of the town. We had lunch and then went to see the Porcelain Works. An intelligent guide showed us through each of the departments. Great skill was exhibited in moulding or modelling the various objects,



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in painting or decorating them and in covering them with a protecting glaze. It was all extremely interesting. In the exhibition room there were many beautiful things for sale and a capable young woman who could speak English fluently-probably other languages too. For Mk. 24 I bought an exquisite little pitcher with a view painted on it of the village of Herrnskretchen on the Elbe, not far away, and for Mk. 5.50 a small plate. My companion made similar purchases.

We then wended our way back to the town and waited for the 5.52 train which carried us to Leipzig. We thought the scenery on our trip was the finest we had seen in Germany.

#### Cuckoo Clock Land

Soon after our arrival in Leipzig I noticed some interesting clocks in Franz Weiss's store on Peter Str. and inquired the price of some of the "cuckoo" variety. I felt a certain pleasure in being in a land where these things were made. The price of the one with the handsomest carving was Mk. 36, and there were some as low as Mk. 16. I made up my mind to take one home with me but let the matter stand for the time. Then I thought it would be useful to have a clock on the wall of our study-room and so, after three weeks, I called again and bought the one I had admired most. When I told the proprietor that I would be taking it back to America and might have to pay duty he made the price Mk. 34.50<sup>3</sup>. The clock was delivered to our apartment and I put a screw in the wall and mounted it myself. It kept time for us all the weeks we were in Leipzig, then I packed it in my trunk, and the customs officer let it enter my country free. It reached my home in good order and ever since has cheerfully called off the hours and half-hours in my study. Of course it has needed some repairs, and a competent clock-repairer remarked that the works were much better than those ordinarily seen in a cuckoo clock.

However, after 45 years of service the teeth of the main drive-wheel were



badly worn and an expert watch-maker made me a new one, which he said was far superior to the original wheel. I have no doubt the clock is good for a second half-century. During the second great war, however, the fine flexible leather on the bellows of the two little organ pipes wore out and my aforesaid expert was unable to secure leather which could replace it; but an ingenious mechanical friend suggested the use of oiled silk and soon had the bird singing again!

#### American-British Union Church

In a foreign land it is satisfying to attend a religious service conducted in one's native language. We used to go to the American-British Union Church which met in the Erste Burgerschule. There was a service at 5 o'clock which we attended and ordinarily about 100 were present. After the service on May 15 one who had acted as an usher, a Mr. Howe of Indiana, asked us our names and introduced us to the pastor, J. E. Maxwell, M.A., who invited us to call on him on Thursday-or any other evening. I noticed in the congregation one of the ladies on our ship from New York. Such a ministry as this of Mr. Maxwell was of great value to the many students from America and Great Britain.

#### Book Business in Leipzig

Leipzig for many years had been considered the centre of the book trade of Europe and several large and imposing buildings had been erected in connection with it. Chief of these were the Buchhandlerhaus (bookseller's exchange). Within the latter was the Museum of the Book Trade. Here we saw some of the finest specimens of both old and late printing. Much of the early work seemed to have been done at Mainz, and the bibles and old classics printed on parchment and illuminated were very fine. We saw there a copy of Holmes's "Life of the Queen". Just the year before this, Queen Victoria celebrated the 60th anniversary of her coronation in 1837. The volume was magnificently produced, worthy to be placed among the others collected there.

There was also a historically arranged section to illustrate the production



of books-printing, wood-cutting, engraving, lithographing, binding , etc., by means of models and proofs. It was all intensely interesting and during the war when there was a report that these book-business buildings had been injured by bombs I hoped the report was untrue. I may say, however, that injuries were done on the other side of the conflict. Drawings and photographs for the illustrations of a book of my own; which were stored on the premises of a London publisher were destroyed by an enemy bomb.

#### Callon Gustav Wiedmann

Before I should leave Leipzig I wished to interview the respected Geheim-  
erat Professor Dr. Gustav Wiedemann. So on July 6th, shortly after noon, I went up to the Physics Building. I rang the bell and the janitor took my card. After a brief interval he returned and told me to go in. Wiedemann was sitting at his desk writing, and greeted me pleasantly in good English. He was not well and said he could not get about and work as he used to. He said he did not know why. At that time he was 73 and had been in Leipzig since 1871. I wished him many more years of life. He said he would be pleased to render me any assistance. He said he had had Toronto students and they usually worked too hard. As others were waiting I could not stay longer. He died in

#### Preparing to leave Germany

The University term was coming to an end and we prepared to leave Leipzig. At 7 a.m. July 15 I attended my last lecture with Drude, and in it he explained Wiener's notable experiments on "standing light-waves". In the domain of sound it is easy to produce standing waves in a stretched string or in the air-column in an organ pipe. Indeed if you can produce standing waves in a medium you can be certain that the medium is being subjected to a wave motion. Now for certain centuries there has ever been recurring the fundamental question whether light is due to wave-motion or to shot-out corpuscles. Light travels so fast and its waves-if they exist-are so short that experiments on standing waves are extremely



difficult to make. Otto Wiener in 1890 had obtained evidence of standing waves within a photographic film and had thus demonstrated the validity of the wave theory of light.

For some years I had been interested in Wiener's work and had written to him to secure, if possible, photographs and lantern slides from his negatives; and then, when I determined to go to Germany, I wrote that I hoped to see him. Wiener was now professor of physics at the University of Giessen which could be reached by an off-run from the route we were taking when leaving the country.

During this day we busied ourselves packing our trunks. It soon became evident that I could not carry with me all the books I had collected, so I removed them and put them in a parcel to be taken over to the firm of Brockhaus, which was agent in Germany for the Library of the University of Toronto. They agreed to enclose them in their next shipment to Toronto. I was then able to bestow comfortably all the rest of my belongings.

But as we intended to occupy several days on the way to Paris and in seeing that city, before passing on to London, we decided to ship our two trunks directly to England. We packed them carefully and tied them up securely and attached tags addressed to me at my uncle's address in Manchester. For the use of the customs officers we sent separately the two keys tied together and to a tag bearing the same address as the trunks. On July 16 at 6.30 p.m. they were removed from our apartment by a Dienstmann in a uniform, with a peaked cap, and taken in a hand cart to the shipping office of a big firm of forwarders. On the 18th (Monday) we called there and paid for the service. The actual weight was 106 Kg. but we paid on 110 Kg. at M. 18.00 per 100 Kg., amounting to M. 19.80, insurance M. 1.00, postage on the keys M. 1.50, and M. 2.00 for the Abholung of the Koffer by the Dienstmann, a total of M. 24.30 or \$5.78 in all. It was a



great satisfaction to be relieved of the worry involved in checking two heavy pieces of baggage through two international borders.

### Travelling to Paris

When we were travelling about Germany I generally looked after railway time-tables and fares. We always rode in third class compartments, and wished to try third class to Paris. I wrote to Thomas Cook and Son to inquire about this, and the reply was that they could not supply third class tickets between Leipzig and Paris and that the second class fare was £5 12s. However we had enough confidence in ourselves to make the attempt.

So on Tuesday July 19 we rose at 5 a.m., had breakfast at 5.20 and started out carrying our bags to the station. We bought tickets for Frankfurt, 237 mi., M. 18.00, and the train left at 6.13. Soon after 8 o'clock we arrived at Weimar at which place we stopped over. It was the capital of the grand-duchy of Saxe-Weimar and had a population of 27,000. It was a pleasant old town with modern suburbs, but it derived its chief interests from the literary association connected with it. Here lived Goethe most of his life, Schiller, Herder, Weiland and others.

At Weimar in July 1919, following the First World War, the constitution of the new German Republic was adopted by the National Assembly.

Further, on August 9, 1928, my wife and I stopped over at Weimar. She remained there while I went to nearby Jena to discuss with the firm of Zeiss the possible construction of the great telescope for the David Dunlap Observatory. Upon my return we continued on to Leipzig to view the scenes which were familiar to me thirty years earlier.

We visited the Goethe National Museum which was in the house occupied by Goethe for forty years. Also, we went to the Cemetery which was on the south side of the town. It contained the Grand Ducal Vault in which the remains of Schiller (d. 1805) and Goethe (d. 1832) were kept in oak coffins covered with laurel wreaths, from which we were permitted to carry away some leaves,--which I



still have. Dukes Charles Augustus (d. 1828) and Charles Frederick (d. 1853) and their consorts rest there. In another part of the city we noted the Goethe and Schiller monument and Schiller's house and I took photographs of them.

We boarded the train again at 1.33 p.m. and went on to Frankfurt, which we reached at 8.02. We put up at Die Drei Kaiser and then went out to see the town. On the way to Frankfort we were in the same compartment with a man and his wife from Chicago who intended to stay in Weisbaden for several months. They would hardly believe we were Canadians as we did not speak French.

Next morning, July 20, I left at 8.48 for Giessen, 40 miles to the north, to see Professor Wiener. He was at the station but we missed each other, and I got a man to direct me to the Physical Institute. I found Wiener a very agreeable and obliging fellow. He talked in German and I in English and we got along pretty easily. He showed me his new building, an imposing big affair, requiring still some months to complete it. I remarked to Wiener that the headmaster of the high school which I attended in Canada was a Ph.D. of Giessen. I got the lantern slides illustrating standing light-waves made from Wiener's original negatives, and expressed my admiration and thanks for them. He got an outside photographer to make them and the price was 60pf. or 15 cents each. Wiener urged me to stay and take lunch with him but I could not do so and he accompanied me to the station to say Auf Wiedersehn.

I got back to Frankfort and found Carruthers awaiting me. He praised Frankfort highly. The chief streets were wide and lined with large modern business buildings-like a street in a big American city. The Post Office, Railway Station and Theatre were very fine. On the outside of the latter was an indicator showing the temperature of the big hall within. At the time it was 15°R. (Reaumer) which is equivalent to 19°C. or 66°F.

Later in the afternoon we went on to Mainz, 144 mi., and put up at the Hessischen Hof, getting a very nice room for M. 4.50. Mainz was not very big but



the soldiers there were as thick as flies in summer. The fortifications also were very much in evidence. We also noted two beautiful bridges over the Rhine.

Next day (Thursday, July 21) was a fine day, as had been all the days of the previous week. We were to take the steamer leaving at 9.30, and started out by tram at 9 o'clock, but just as we arrived at the river I discovered that I had forgotten my camera. I hastened back, but by the time I returned the boat had been gone ten minutes. We took a slower boat which left at 10 o'clock. The trip was charming, but the historic river was smaller and shallower in places than we expected it to be. Not in the same class as the St. Lawrence or the Niagara! We passed all the old castles--and some new ones--and numerous places whose names were familiar to us. Of these I think Bingen had the greatest interest, derived from the verses in the old Third Reader with the red cover, "For I was born at Bingen--at Bingen on the Rhine". When I was a child I did not bother ~~XXXX~~ about the author, but later I was interested to learn that the "Hon. Mrs. Norton" was a granddaughter of Richard Brinsby Sheridan and that she was a crusader for women's rights. Coblenz and Bonn were pleasing cities. We had an excellent dinner aboard the steamer Humboldt for about M. 4 apiece which at the time we thought expensive.

We arrived at Cologne at 7.15, three-quarters of an hour late. We applied at Hotel Ernst for a room. An attendant quoted the price of one still available and we walked with him up to the top flat to see it. I remarked to Carruthers, in English, that the room seemed as high in price as it was in the building. The attendant said, also in English, that it was the cheapest room they had! I felt flat!

It was still daylight and we surveyed the famous Cathedral, but the hour was too late to obtain admittance. Of course we bought Cologne water for the folks at home and also some photographs of the Cathedral and of scenes on the Rhine. Then to bed, as we were to be off again early in the morning.

We rose at 5, had breakfast at 5.30 and went to take the train leaving at 6 o'clock for Paris. At first it was a good one and we made good speed, but at Liege we changed trains and again at Namur. We reached Charleroi sometime after noon, 140 miles on our 305-mile journey. The third class fare from Cologne to Charleroi was



M. 7.40. The notices in Charleroi were in French and Flemish and we had difficulty in making ourselves understood by the ticket agent and others. But at last we "got it straight" that if we continued to travel 3rd class we could not reach Paris until 9.45. So at 2.30 we boarded a train which carried only 1st and 2nd class passengers, and we reached the Gare du Nord in Paris at 6.35.

We had been given the name of the Hotel De Cologne on rue Trevisé as a decent and quiet house. There we obtained a room on the top floor for 5 francs. Then we set off down the Seine and rambled about in order to get accustomed to the place. Using the wonderful divided map in Baedeker's Paris we had little difficulty in finding our way anywhere.

As we expected to spend only four days in Paris we planned carefully how to use our time wisely. I wished to examine certain pieces of physical apparatus. At this time Paris was distinguished for its scientific instruments. When James Loudon in 1878 established a physics laboratory at the University of Toronto he made extensive purchases of standard apparatus manufactured in Paris. Of these the most noteworthy were the instruments made for teaching and research in acoustics by Rudolph Koenig. He was a real artist in producing them. At the Centennial Exhibition at Philadelphia in 1876 he had a large and very complete set of tuning-forks, as well as some other acoustical apparatus, which Professor Loudon acquired for the University of Toronto. Additional choice items by the same maker were obtained in Paris, and Loudon and Koenig became good personal as well as scientific friends. I believe the University obtained thus a unique set of tuning-forks starting with a pitch of 256 cycles per second and rising by intervals of 4 cycles up to 512 cycles, that is through a full octave, and requiring 65 forks. Each was mounted on its perfectly-tuned resonance box. Then there were forks and steel cylinders with accurately determined frequencies several octaves higher and lower than the above, and ranging in size from what might be carried in the vest pocket to massive 'engines' of steel and brass weighing two hundred pounds or more. They were all constructed with excellent perfection.



Thus the University of Toronto had a good contact with Rudolph Koenig and members of the staff in physics when visiting Paris were always sure of a good welcome from him. I had written to him from Leipzig that I hoped to call upon him, and Professor Loudon had written to Koenig introducing me.

Paris was also famous for its optical apparatus. French scientists were noted for their researches in light, and, I may add for their lucid text-books on that subject. The instruments they used were usually constructed in Paris. We had in Toronto many optical instruments which came from Paris. I wished to examine particularly a polarization microscope made specially for exhibiting the coloured rings and other figures obtained when polarized light is projected through a thin plate of a crystal. Such a microscope is indispensable in investigations in mineralogy and is also important in the theory of light.

Next morning (Sat. July 23) we walked down to the Seine again, and I went to call on Dr. Koenig. He was at his place of business, awaiting a visit from a Russian professor at the University of Kiev, who was forming a collection of apparatus. I did not stay long, but arranged to return on Monday.

I went back to my companion and we visited the Cathedral of Notre Dame. Though famed in history, the building is not striking in appearance nor prominent in location. The two towers seemed somewhat "sawed off", although I learned they were 223 feet high and the platform on top was reached by 397 steps. We visited it on account of the many notable events which had occurred around it since it was consecrated in 1182. It was sadly desecrated during the Revolution and again by the Communards in 1871.

Behind the church on the Seine shore was the Morgue, a gruesome place, in which the bodies taken from the water were placed on marble slabs and kept for identification three months if necessary. There was one body there—an old man, poorly dressed.

Sunday was a day for sports and celebrations in Paris. In the morning we



went to the Louvre. We learned that simply to walk through all the rooms without stopping would take two hours, and so we confined our attention to the sculptures, especially the ancient ones, and indeed the objects in this department occupied all of our time. The two best things were, of course, the Venus de Milo and the Winged Victory. The former statue, we were informed, was found in 1820 by a peasant on the island of Melos at the entrance to the Greek Archipelago and was sold to the French Government for 6000 francs. The latter, although much mutilated, is easily recognized as a masterpiece. It thrilled me to realize that these were the actual real original articles.

In the afternoon there was a celebration of the centenary of the birth of the noted French historian Michelet (1798-1874). It was to be held in front of the Hotel de Ville and the chief feature was to be the ballet. This seemed odd to me but I believe it was typically Parisian. At any rate we did not attend.

In place of it we went to the Bois de Boulogne. Although this place had famous historical connections, it was chiefly devoted, in my mind, to sports and stylish parades, as suggested by the couplet in the college song, "Rosalie".

"I ride in the Bois in my little coupe,  
And I tell you I'm something to see".

So we took the steam tramway to the west as far as the fortifications and then walked up through the Bois and home again by the Avenue de Boulogne and the Avenue des Champs-Elysees. I never saw so many 'swank' equipages and such an exhibition of the "pride of life" as on that Sunday afternoon.

In the evening we strolled along the Boulevards. During the afternoon the traffic was enormous, but in the evening the brilliantly lighted shops and cafes gave one the impression of light-heartedness and a fondness for frivolity.

On Monday morning Dr. Koenig went with me to the establishment of Ph. Pellin, the maker of optical apparatus, and it was arranged that I should go there again on the following morning, when they would demonstrate the polarization apparatus.



I met my companion Carruthers at 1.30 p.m. on the Pont des Arts which we were anxious to see, after reading Hauff's charming story, "Die Bettlerin vom Pont des Arts". The bridge was of iron, for foot passengers only, and was constructed in 1802-04 between the Old Louvre and the Institut. It derived its name from the 'Palais des Arts', as the Louvre was once called. The story was published in 1827.

From here we went to the Hotel des Invalides, going by way of the Trocadero, which is not far from the familiar Eiffel Tower. There is the Trocadero Palace and the Trocadero Park in front of it. The name is that borne by one of the forts of Cadiz captured by the French in 1823. At the time we were in Paris active preparations were being made for the Exposition of 1900.

The Hotel des Invalides which occupies an area of 30 acres, was founded in 1670, to provide a happy existence to needy soldiers. It was intended to accommodate 5,000 persons, but in 1898 not more than 200 veterans were there, and parts of the building were devoted to other purposes. We were particularly interested in the Emperor Napoleon's Tomb. It was the finest memorial I have ever seen. The block of red porphyry out of which the tomb was made was brought from Finland and weighed 67 tons. The sacrophagus is, I believe, composed of six pieces. Around it, on standards, were sixty flags which had been captured in battle by Napoleon.

After this we walked down the Avenue de Breteuil to see the Artesian well of Grenelle of which I had read in text-books on physics. It was said to be 1800 feet deep and that it had been pouring out great quantities of water for many years. Over it there was a tower 108 feet high, but there was little else that we could see.

Tuesday, July 26, our last day in Paris! This morning we went to the Pantheon. Here are many memorials "Aux grands hommes la patrie reconnaissante", but I desired chiefly to see where Foucault in 1851 mounted his long pendulum to demonstrate the rotation of the earth. However we were too early to get in. So I left my companion and went across through the Luxembourg Gardens to Pellin's shop on rue de l'Odeon.



One of his workers exhibited the apparatus for projecting on the screen, by means of polarized light, the rings formed by crystals of different kinds. As a source of light in his lantern he used the oxy-hydrogen light. The beautiful patterns in brilliant tints were shown but I thought they were rather small, much as I had exhibited them in my lectures on physical optics at Toronto the year before. Also present at the demonstration was the Russian professor from the Ukraine. His name was: "Dr. Georg De Metz, Professor der Physik an der Sanct-Wladimir Universitat zu Kiew". I had a chat with him in German. He was acquainted with Ernest F. Nichols who became professor at Dartmouth College. They were students together at Berlin.

I then ran down to Carpentier's atelier, where many pieces of apparatus at Toronto had been made, but the shop was closed as the workmen were having dejeuner. Then I went to Koenig's again and he showed me some experiments on beats with his tuned bars.

In the afternoon we visited the Louvre picture gallery, and we saw also in the Galerie d'Apollon the Regent diamond, a Rose diamond and Napoleon's sword set with gems. There were many fine pictures but, to me, none equal to Dresden's chief treasure.

We left Paris next morning (Wed. July 27) by way of the Gare St. Lazare. We bought our billets, and beside the train we found W. H. Walker, B.A. '85 (U. of T.), of the Governor-General's Office, Ottawa, whom we had met in the Louvre on Sunday. We all went over to London together,--first to Rouen, then to Dieppe where we took passage on the Sussex. We left at 1.30 p.m. and reached Newhaven in 3½ hours--the speediest boat-trip I ever made. Boarded the train at Newhaven and in 2 hours more we were at London Bridge Station. There we said good-bye to Walker, and then took a hansom to 11 Craven St., Strand, to which I had been directed by relatives in England. There was a vacancy. In the evening we paraded the Strand, Fleet and other streets whose names were familiar to us and then went to bed. We were pleased to be back amongst those who spoke our mother-tongue.







### IX. The Sober and Sensible Nineties

Some persons take pleasure in making cynical remarks on the "gay nineties" or the "late Victorians". I think rather of the sober and sensible people who lived when I was a young man. As samples of the entertainments which were offered then, I may mention the following events in the literary and musical world. Every one of them stand out clearly in my memory. They will bear comparison with what is served to the people at the present time (1950).

#### 1890, June 4 & 5.-Gilmore-Philharmonic Festival Concerts.

P. S. Gilmore in 1869 organized in Boston a musical festival with a chorus of 10,000 voices and an orchestra of 1,000 musicians, and the concerts were given in a specially-erected building seating 50,000 people. This was to commemorate the restoration of peace in the United States, and it was very successful. This big venture, however, was altogether exceeded in 1872 by his World's Musical Festival, which included a chorus of 20,000 voices and 2,000 instrumental musicians, and which was presented in a great building with a seating capacity for 100,000 people.

F. H. Torrington assisted Gilmore on these two occasions. In 1873 he removed to Toronto and soon afterwards he organized the Toronto Philharmonic Society which for many years was Toronto's outstanding musical society.

Gilmore organized his famous band and gave concerts all over America and Europe, and it was considered the greatest military band in existence. He brought it to Toronto to give, in conjunction with Mr. Torrington, four concerts in the Horticultural Gardens Pavilion. In addition to the four top-ranking vocalists accompanying the Band, two Toronto ladies, Miss Kate Ryan and Miss Evelyn Severs were soprano soloists. A chorus of 300 voices were under the direction of Mr. Torrington, and the entire festival was a great success. This was the first time I had heard such concerts and I was simply thrilled.

#### 1894, Feb. 15.-Antigone by Sophocles.



In 1880 Maurice Hutton came out from Oxford, England, to be professor of Classics in University College, and two years later the Greek play *Antigone* was presented in Convocation Hall. In 1894 it was given again but this time in the Opera House. In 1884 women were admitted as students in University College and they took the women's parts. In 1893 the play had been presented at Vassar College and a 120-page book containing the Greek text and Jebb's translation on opposite pages had been published by Ginn and Co. By the cordial co-operation of all concerned, an edition was printed from the same plates and sold at a low price. This helped materially in making the play understood.

On this occasion I was accompanied by the one who became my wife four months later. The costumes, the acting and the singing were very creditable and we enjoyed the entertainment greatly. The Governor General Lord Aberdeen and the Lieutenant-Governor of Ontario, G. A. Kirkpatrick, were present, and although the performance lasted 1½ hours the audience did not want to leave.

In 1906 Hutton wrote: "On both occasions even the unlearned were enabled, through the histrionic skill and beauty of the presentation, to feel something of the grandeur and pathos of Attic tragedy".

1894, Nov. 4-8, -Evangelist Moody in Massey Hall.

At this time Moody was 57 and he had a great reputation in the United States and Great Britain. There was a book in my father's library describing his visit to the latter country in 1873-74, which I had read, and I was favourably disposed towards him.

On Sunday afternoon (Nov. 4) my cousin Arthur and I went to Massey Hall. It was filled and overflowing. By chance we slipped in by a side door and we stood with our backs against the wall during the entire service. I liked him very well but there seemed nothing striking about him.

~~On Wednesday evening my wife and I went to hear the evangelist and although we arrived an hour before the time for the opening~~



On Wednesday evening my wife and I went to hear the evangelist and although we arrived an hour before the time for opening the meeting we had to sit in the top gallery,--yet we heard the speaker fairly well. I never saw such a large crowd exhibit so much religious feeling.

1895, Jan. 31--Lew Wallace, author of "Ben-Hur".

General Wallace (1827-1905) lectured on "Ben-Hur" in the Pavilion of the Horticultural (i.e. Allan) Gardens. This was one of a course of lectures which had been arranged for the citizens of Toronto that winter season. Besides being famous as an author, Wallace had an honourable reputation as a lawyer, a soldier and a diplomat. In 1873 he published "The Fair God", which is a story of the Conquest of Mexico. At this time he said he was quite indifferent to religious matters; but afterwards he took part in a conversation on God, Christ and other deep fundamental questions, and realizing his ignorance he set out to remedy it. A result of this was the story "Ben Hur, a Tale of Christ", which appeared in 1880. It was a great success. The description of the chariot race near the end of the book became a favourite selection for a public reading. At the University Conversation on Feb. 15, 1889, I heard it read by Miss Nora Coleman. I bought a copy of the book in 1887-88, and was especially struck with the account of the Magi. It was altogether new to me. Any person who reads the book must be impressed with the care taken in describing every detail of every incident, and one is not surprised to learn that the author spent five years of strenuous labour in its preparation. Wallace stated that before he had completed his task he was convinced that Christ was divine and that the Gospels were authentic. This was a noble acknowledgement.

Wallace's third story was "The Prince of India", which was published in 1893. It deals with the Wandering Jew and the Byzantine Empire.

1895, Feb. 12,--General Booth of the Salvation Army.

William Booth began to hold street meetings in London in 1865. The work



continued to grow and in 1878 his mission was organized on a quasi-military basis. The name The Salvation Army was definitely adopted in 1880. Its operations soon began to spread. When I was teaching in a country school in 1884-86 they had hardly reached the country places. I remember how one of my older pupils went for a visit to friends in a larger town and while there attended some Salvation Army meetings, and how on returning home she gathered together some of the younger girls and showed them how the Army carried on their meetings.

In 1890 Booth, with the assistance of W. T. Stead, published a book entitled "In Darkest England and the Way Out". At his meeting in Massey Hall he explained his scheme of social reform. The chairman of the meeting was Oliver Mowat, Premier of Ontario, and on the platform were G. W. Ross, Minister of Education, Chancellor Burwash of Victoria College, and other prominent people.

Booth delivered a stirring address and the audience was sympathetic and enthusiastic. A touching incident was the presentation to the General of an address by a committee of ex-criminals and down-and-outs which had been rescued by the Salvation Army. He told some very pathetic stories from his own experiences and interspersed them with a good deal of humour. The Chairman expressed his pleasure with the address, and Mr. Ross moved a vote of sympathy with General Booth in his great work.

Just at the beginning of the meeting smoke was seen issuing from a grating in the front of the platform and there was fear of a panic. General Booth quickly stood up, walked forward and said there was no danger, and he called on the Band to play. They struck up a lively Army tune, the smoke soon disappeared and the meeting proceeded.

1895, Mar. 26, -Sousa and his Band (1854- ).

John Philip Sousa was born in Washington, of Portuguese parents. He was given a thorough musical education and in 1876 at the Centennial Exhibition he played in Offenbach's orchestra. He was distinguished in various branches of music. His compositions include comic operas, songs, marches, a symphonic poem entitled



Theodore Thomas (1835-1905) was born at Essen, Germany. At the age of five he appeared in public as a violinist. He was taken to America in 1845 and he played first violin in the orchestra which accompanied Jenny Lind in her tour in 1850. Surely he was a musical genius! In 1862 he began to organize his own orchestra and he became famous for its popularization of Wagner's characteristic music. In 1888 Thomas formed the Chicago Symphony Orchestra and soon made it one of the foremost organizations of its class in the world.

In the eighth year of its existence it came to Toronto and my wife and I were privileged to hear it. I was sorry there was not a full house as the playing was very fine. I had never heard anything equal to it. It was called a popular programme but every number on it demanded special skill in its presentation. The overture Leonore (Beethoven) and the dances from Henry VIII (Edward German) we thought especially pleasing.

1897, Feb. 22, -Madame Albani.

Madame Albani was born Rosa La jeunesse in Chambly, Quebec, in 1852. She first sang in public in Montreal at the age of seven. She studied at Milan, and, on the advice of her teacher there, she chose for stage purposes the name Albani, after an extinct Italian family. She made her European debut in 1870 and achieved immediate success. This was repeated in London in 1872, and for many years she enjoyed fame and popularity. In 1878 she married Ernest Gye. I remember her signature, E. Albani Gye.

Her Toronto concert on the above date was an excellent one, enjoyed by everyone of her large audience which included my wife and myself. Her first piece was of the pyrotechnical kind, to show what she really could do, and then she gave simpler ones, including Home, Sweet Home, Robin Adair, The Last Rose of Summer, and others. In her company were, Bracton Smith, a fine tenor; Lempriere Pringle, a pleasant bass; Miss Robertson, pianist, whom I did not greatly admire; and Miss Lange.



Ben Hur, and he also wrote on the Transit of Venus and an autobiography. Two years before Venus crossed the face of the sun, which occurred in 1882, Sousa became bandmaster of the U. S. Marine Corps band, and it acquired a high reputation under his leadership. In 1892 he organized his own band, and with it he touched the world. The name "March King" was given him by the editor of an English musical journal. My friend Ferrie Hull, my wife's sister Isabel Laidlaw, my wife and I listened to a fine programme, rendered rather long by many encores. I thought his Manhattan Beach, Liberty Bell and one or two encores were much alike but they were all full of vigorous action and movement.

1895, Sept. 23,--Irving and Terry in "King Arthur".

Irving was born in 1838 and died in 1905. He was famous over several decades and in 1895 he became Sir Henry, the first actor to be knighted. In September of that year he came to Toronto and G. F. Hull and I were able to hear him. We had a lively scramble to secure seats in "the gods" in the Opera House at a dollar apiece. The play was Conyns Carr's "King Arthur", and to my mind it was not very successful. I was an admirer of Tennyson and had read his "Idylls of the King". The plot was very different from that of the "Idylls". It seemed very difficult to present to a modern audience a dramatized account of the old legends. But we were pleased to see and hear the famous actors, Irving and Terry.

1895, Dec. 16.--Madame Melba and her Company.

Melba was born Nellie Porter Mitchell in 1859, and in 1882 she married Charles Armstrong. Her stage name was taken from Melbourne, Australia, which was near her birthplace. Her liquid bird-like voice and brilliant execution charmed the world for many years. When I heard her I thought of the little song-sparrow with which I was familiar from childhood days. The seats this time were \$1.50 each. At 8.15, or soon after, the concert began and there was not a poor number on the programme. Melba was superb. Her first piece had flute obligato and exhibited her remarkable power. In her company were Campanari, Daubigne and Scalchi and all were of the first quality.

1896, Jan. 8,--Theodore Thomas Orchestra.



the violin well. Albani's characteristic shuffling off the stage caused peals of laughter.

1897, Oct 7,--Sir Wilfred Laurier at University Convocation.

Laurier was born Nov. 20, 1841, at St. Lin, Quebec, of French Roman Catholic parents. He attended the elementary school of his home parish, and, in order to learn English, also a Protestant elementary school at New Glasgow, living during the latter period with a Presbyterian family. This experience had a permanent influence on his mental outlook.

He studied law and practised chiefly in the country town Arthabaska. In 1874 he was elected as a Liberal to the House of Commons. When Edward Blake resigned as leader of the Liberal party in 1887 Laurier was chosen his successor. At the general election on July 11, 1896, the Liberals won and Laurier became Premier, which position he retained until Oct. 6, 1911.

To the Diamond Jubilee of Queen Victoria in the summer of 1897 Laurier went as the leading representative of Canada. His personality made a powerful impression in Great Britain and he was given the Grand Cross of the Bath. He returned to Canada proudly wearing his honours. He was the true and loyal Knight who had paid homage to the Great Queen.

In the autumn he came to Toronto to receive from the University of Toronto the honorary degree of LL.D. The Convocation was held in the Pavilion, and there was a full house, with much noise and cheering. B. E. (Sir Edmund) Walker, a member of the Board of Trustees, presented Sir Wilfred to Chancellor Blake, who expressed his great pleasure at receiving the distinguished candidate and conferred upon him the degree. Laurier signed the Roll and then made a short speech. I had heard the speech he made at the opening of Parliament in 1891 and I noted his impassioned profession then of his love and loyalty for his own native land. On the present occasion he stated that he had received degrees from the ancient universities of Oxford and Cambridge, but this one was from a great university in his own country and he valued



it above the others. Then Chancellor Blake made an address and it was all over.

I had an introduction to Sir Wilfred after Convocation was dismissed.

1897, Nov. 6.-Cinematographe.

This was the first moving-picture show which I attended. French scientists and mechanics have been for many years in the forefront in applying the principles of optics and the films, as well as the projecting machine, used on this occasion were made and shown, I believe, by the Paris firm of Lumiere-a very appropriate name as lumiere is the French word for light. The exhibition was given at 288 Yonge Street, in an empty dry-goods store, and the admission that day (Saturday) was only ten cents. Indeed for a number of years, especially in the smaller towns, the admission was five cents and the entertainments were dubbed nickel shows.

The projecting machine was remarkably good and the films were of superior quality. Among them were three depicting the Queen's Diamond Jubilee procession. One of them included the Queen's carriage. Her umbrella was held low most of the time, but just before the film ended she raised it so that her face could be seen clearly. The audience was highly pleased.

1897, Nov. 13.-Nansen's Voyage to "Farthest North".

Nansen's lecture was given in Massey Hall to a fair audience. The ground floor was completely filled and there were many in the galleries. Our seats were about four rows from the back and the price was seventy-five cents. Alongside my wife and myself were our friends James Brebner and his wife.

We enjoyed the lecture exceedingly. The views were superb and the language used by Nansen was remarkably good. I missed a few words occasionally but this happened generally during applause or when something else interfered. To me it was almost unbelievable what Nansen and Johansen underwent and that with no apparent injury. For months at a time it was impossible to have on a really dry shirt, and on going to rest in their sleeping bags their clothes would be hard-frozen stiff. They would put their frozen mitts close to their bodies in order to thaw them out and make them usable the next day. Their experiences day after day were discouraging-the same boundless wind-swept waste-and indeed impossible to bear except by the



by the sturdiest of men. But the end came dramatically. They heard a dog bark, and their rescue by the English explorer Jackson was thrilling. We were greatly pleased that we were at the lecture.

1897, Nov. 22, -Anthony Hope Hawkins (1863- ).

This evening we went to hear Anthony Hope give readings from his own works. At this time he was quite famous but the audience seemed small in Massey Hall--about 800, the newspaper said. He was a good public reader and gave five selections. The first was from "The Philosopher in the Apple Orchard", the next was from "The Prisoner of Zenda", and the last three were from "The Dolly Dialogues". The latter ones were most suitable for an ordinary audience and they were greatly enjoyed. Anthony Hope's specialty was light drawing-room comedy and narratives filled with romantic inventions and burlesque humour, all moving swiftly along. We were glad we went to hear him.

1898, Jan. 15, -Alfred Baker on Greek Science.

This was a regular 'Saturday Lecture' and it was given in the hall of the Student's Union (which was removed to make room for Hart House). Professor Baker gave a very excellent account of Greek contributions to arithmetic, algebra, geometry, astronomy, differential calculus and other branches of science. He said that if they had not been overthrown and scattered they would have discovered Newton's and Kepler's Laws a thousand years before these men lived. Professor Baker's lectures were always brilliant and easy to follow. I recall his lectures on "The poetic interpretation of Mathematics" and on "Astrology". I think it can be said 'He touched nothing that he did not adorn'.

1899, Feb. 18, -Dr. W. H. Drummond (1854-1907).

William Henry Drummond was born in Ireland and came with his family to Canada about 1864. He was a telegraph operator in Quebec and later studied medicine at Bishop's College, Lennoxville, Quebec, where he obtained his degree in 1884. Four years after this he went to Montreal where he practised medicine and wrote verse in his leisure time.

Towards the end of 1897 Drummond published "The Habitant and other French Canadian Poems" (N.Y. Putnam). He endeavours to show how the plain French- Canadian



person would relate his own tales to English-speaking auditors not conversant with the French language. This he was able to do with a natural friendliness, good nature and skill. The book achieved a wide popularity. The copy I have is of the 49th printing and 66th thousand.

On the above date his lecture was in the Saturday series at the University of Toronto, and his subject was "The Habitant". He gave an appreciative sketch of Jean Baptiste and then recited several poems illustrating various types of that gentleman. These included, "The Habitant", "The Wreck of the JULIE PLANTE", "Johnny Couteau", "When Albani Sang" (in which Jeremie Plouffe of Chambly takes his neighbour Antoine to Montreal to hear Albani sing), and "De Belle of St. Michel".

With me to this lecture went my friend R. K. Row an esteemed fellow-student at the St. Catharines Collegiate Institute and later a well-known educationist in the United States.

Drummond returned to the University to give the Saturday Jan. 21, 1905.

1899, July 1, Dominion Day.-The Biograph.

On this (Saturday) afternoon my four-year old daughter and I went to see the Biograph, which had been showing moving-pictures all week in Confederation Hall. There were several types of moving-picture machines on the market at that period. This one was patented in England in 1897 by H. Caoler. The film roll employed was  $2\frac{3}{4}$  inches in width and the pictures themselves measured about 2 by  $2\frac{1}{2}$  inches. This great size of film demanded enormous speed and massive construction of the projecting machine. The results, however, were described as magnificent.

About 150 or 200 persons were present and the programme was very interesting. There were 36 short views of various subjects and I thought them rather better than those shown by the Cinematographe. That word, I may say, was at that time often used to indicate any type of moving-picture machine.

1900, Feb. 10.-Ernest Seton Thompson (1860-1946).



This was a University Saturday lecture. Some years later the lecturer adopted the name Ernest Thompson Seton. His father was heir to an earldom but did not claim it. Seton was the old family name.

Thompson was a born artist and a lover of nature, and sprang into fame when he published "Wild Animals I have Known", which I read in the summer of 1899. For some years he lived in Toronto, and my wife told me that when she was a young girl she posed as a model of Little Red Riding Hood for Thompson.

A powerful realistic painting by Thompson was entitled "Awaited in Vain". It was shown at the World's Fair in Paris (1900) where it was criticized, envied and admired. Later it was exhibited in Ottawa and Toronto. It depicted a grey wolf sinking its fangs into the body of a man and in the faint background was a home with lighted windows. It certainly aroused a feeling of horror.

My wife and I listened with interest and pleasure to this lecture, which was given in the Chemistry Building. The room was crowded and the whole performance was extremely clever and amusing. It was full of pictures, some drawn off-hand on the blackboard, of animal and bird calls, and of odd or thrilling incidents in his life. He spoke with perfect ease and without a note. Thompson Seton died at Seton Village at his adobe residence on a 2500-acre tract near Santa Fe, New Mexico, on October 23, 1946.

#### On the Record

1894, August 31

Received a case of 30 doz. eggs from Blackwater this morning; 8 cents a dozen.

1894, December 19

J. P. Donald called about 7.40 to get me to go into the Confederation Life; but of course I did not do so.

1895, October 18

Went down to Education Department to meet Mr. Seath. He is arranging to add Acoustics to Natural Science and Chemistry and Mineralogy work and we fixed it up



He told me that my papers this year were entirely satisfactory, and said I would be on next year, even though I told him I had served three years.







X A Summer in Britain

On the morning of Thursday, July 29, I went along the Strand again and at a news-stand asked for Bradshaw's Railway Guide, which, I was informed, was published monthly at 6d. a copy. I was surprised when the young woman handed me a big paper-bound volume about an inch thick. "Well", said I, "its big enough!" "O! there are so many stations", she responded.

My father was born in Stoke-under-Ham, in the south-east portion of Somersetshire in 1835, and in 1843 he went with his family to Canada in a sailing vessel which reached Montreal in six weeks. Continuing up the St. Lawrence River, they stayed some time in Brockville and then went on to the town of Niagara, at the mouth of the river of that name, and later to the village of Queenstown. He never went back to England but he remembered many things about his birthplace. In later years he corresponded with two daughters of a neighbour's family named Templeman. My father told them that I should like to visit them, and I wrote to them from Germany. At breakfast at the hotel I was handed a letter from Miss Templeman asking me to go to Yeovil, not to Bath as I had proposed.

I consulted Bradshaw and found that a good train left Waterloo Station at 3 p.m., and telegraphed that I would take it. Its first stop was at Salisbury, 83 miles out. On the way we passed Bisley Common. Here since 1889 the Empire rifle-shooting contests took place, and before that date at Wimbledon, which is much nearer to London, as I knew from reading the newspapers since I was a boy. Then we continued to Yeovil Junction, 123 miles, where I changed trains and went on three miles to the town of Yeovil, arriving at 6.45. There I was met by the Misses Templeman, and we continued westward seven miles to Stoke. This was a very pleasing drive. The rolling country and the winding road, bordered with stone fences and green hedges, together with an abundance of trees around the houses and between the fields, presented a beautiful picture. After supper the two girls and



I tramped over Ham Hill in the long evening, enjoying the charming views and calling on some old residents who knew my father's family.

As I was spending less than 24 hours in Stoke I put in a busy time the next day. Esther Templeman went with me and pointed out certain houses and other features mentioned by my father, and I took photographs of them. I got fifteen in all—three from the top of the Hill, showing the village "under" it and the surrounding picturesque country; three of the stone quarry; and the rest of houses and people in the village. All the buildings were of the local stone, a brownish oolitic limestone. The post office was on a street corner: simple, but with the touch of a good architect. The windows were in sets of four narrow units, in stone frames, and the sash opened outwards. The door, in two halves, with small square panes of plate glass in them, was in a recess in the corner. Above the door-way were four signs, in descending order: Money Order Office, Post Office Savings Bank, Postal Telegraph Office, Stoke-under-Ham. Many houses had tile roofs, and the fences and walls about them were of stone, perhaps with an iron railing, nothing so temporary as wood. Then there was the house in which my father was born, apparently unchanged since he left it, the fine Congregational Church, and, perhaps the most interesting of all, the old saw-pit, with an oak log two feet in diameter and about eight feet long, resting on the timbers across it. As you know, one person stands on the top of the long saw while the other person is down in the pit working the lower end. A most laborious way of sawing lumber!

I never saw a saw-pit in Canada although I suppose they had been used both here and in the United States. Thoreau in describing his experiences when living in his self-built cabin beside Walden Pond, relates that in the winter of 1846-47 a band of men came to cut ice to be stored for use in the summer, and he says:

"He cuts and saws the solid pond, unroofs the house of the fishes, and carts of their very element and air, held fast (on their wagons or sleighs) by chains and stakes like corded wood, through the favouring winter air, to wintry



cellars, to underlie the summer there. It looks like solidified azure as, far off, it is drawn through the streets. These ice-cutters are a merry race, full of jest and sport, and when I went among them they were wont to invite me to saw, pit-fashion, with them, I standing underneath".

With my pocket knife I cut a stick from a big brier bush for my father, and bought him a pair of leather gloves which were manufactured in this part of the country in great quantities.

Stoke-under-Ham seemed a substantial quiet village, but I have never found it shown on a map. I also read the volume on Somerset in the Cambridge County Geographies series; it mentions Ham Hill but not the village.

The maiden name of my father's mother was Male. I called on Thomas Male and on the elderly Mr. and Mrs. Templeman, who all remembered my father's father. My pilgrimage to Stoke-under-Ham gave me great satisfaction.

At 5.15 p.m. we left by the same 'trap' for Yeovil, and there at 6.28 I boarded the train for Newport, Monmouthshire, where my wife was visiting an aunt Mrs. Kerr and family. I telegraphed ahead that I would arrive at 10.47. The distance was only 80 miles but I was  $4\frac{1}{2}$  hours on the way. I had to change trains twice and we stopped at all the stations. A chief part of the business, as I remember it, was to put off empty milk cans. We passed through Bruton, Witham, Frome, Bristol; and nine miles farther on came to the wonderful tunnel under the Severn River. I had read about this triumph of railway engineering, which was open for passenger traffic in December 1886. The estuary here is  $2\frac{1}{4}$  miles wide, but the total length of the tunnel is  $4\frac{1}{3}$  miles. Its cross-section is 26 feet wide and 20 feet high, which is large enough for two lines of rails. The depth below the bed of the river varies from 40 feet to 100 feet.

I was looking forward to passing through this tunnel. Before we entered it the windows of the carriage were closed. We gathered speed rapidly and one could feel that we were descending. Farther and farther we went down, there was a chilly



dampness, and the moisture was congealed on the windows. Then we began to ascend and the speed was reduced. At last we reached the end of the tunnel, and the windows and doors were thrown open to let in the fresh air. Soone we came to Severn Tunnel Junction where we changed to the Great Western Railway, and in half an hour I was in Newport, where my wife and her hospitable relatives were at the station to meet me.

Newport then had a population of 55,000 and it possessed a large export trade in coal and iron. My wife and our three-year old daughter had been here for a week, and we left next day on our tour of visitation. In the morning we went for a walk in the Park and I looked intently across the Channel to glimpse Clevedon, where is the burial place of Arthur Hallam (d. 1833), the friend of Alfred Tennyson who dedicated "In Memorium" to his memory. But the haze rendered the view indistinct. Twenty-seven years later (Aug. 13, 1925) I had the opportunity to visit the parish church and to read the elaborate epitaph to Arthur Hallam written by his father.

We took the train at 1.10 p.m. There was a big (Saturday) crowd at the station and in the trains but we managed to secure seats. We changed at Shrewsbury (92 miles) and then went directly to Manchester (166 miles) where we arrived at 6.15 p.m. We were met at the station by our Uncle Richard and were taken to his pleasant home.

As I have stated, my wife's father had six brothers and one sister. They were all brought up in the Lowlands of Scotland. Three had come south to Manchester, where they were successful and honoured in its commercial life,—Richard, Robert and James Laidlaw. Thomas, the oldest, lived in Lockerbie, Walter had a sheep farm near Walkerburn overlooking the Tweed River, William was in the stationery business in Glasgow, while George lived in Toronto. The sister lived in Monmouthshire, from which we had just come. As we paid our visits to their various homes it seemed to me that every one of them had trophies on his mantelpiece won in bowling in the summer or curling in the winter. Thomas had a granddaughter teaching in South Africa and a grandson in the shipping business in Bombay. Such are the families which have made



Great Britain Great.

Manchester was to me a mighty giant of industry and commerce. Within the city and its suburbs were immense factories for producing cotton, silk, machinery, chemicals and other goods. Some of the business quarters near the centre of the city seemed to me very limited in floor space, but the amount of turnover in a year was astonishing.

Manchester was famous for the part its citizens had taken in the repeal of the corn laws and in the campaign for free trade and unrestricted competition. Richard Cobden and John Bright were two of its great leaders in the immediate past. The celebrated Bridgewater Canal, connecting Manchester and Liverpool, constructed in 1758-71, was a famous achievement. It was an example of boldly taking a great risk in reaching out for bigger business, encountering all sorts of difficulties, and ultimately succeeding.

I was greatly interested in the Manchester Ship Canal, which, when I was there, had been in operation only  $4\frac{1}{2}$  years. I had read about it in our newspapers and magazines,--how its promoters had met with oppositions from the newspapers, as well as from the Commons and the House of Lords; and how, during its actual construction even the elements seemed to conspire against it, and a fierce storm in a single night would destroy the work of months. But at last it was completed, and on May 21, 1894, Queen Victoria attended its formal opening. The canal is  $35\frac{1}{2}$  miles long; one end is within the city, the other in the estuary of the Mersey River, near Liverpool. It proved to be the salvation of Manchester, which required an ocean port of its own to distribute its rapidly growing products to all the world.

Of course I was taken to see how the Bridgewater barge canal is carried over the ship canal. A section of the former is closed off by iron gates and is then made to swing round and allow vessels to move past,--much as a swing-bridge



over an ordinary canal.

The size of some of the public buildings impressed me, but there was something more in them than mere bigness. My uncle took me to see the Town Hall, which contains 250 rooms. In it were statues and busts, and the walls of the great Hall, which is 100 feet in length, were covered with mural paintings, by Ford Madox Brown, of scenes in the history of Manchester. Just within the main entrance was a statue of James Prescott Joule (1818-1889), sitting in a chair examining a model of his first apparatus for determining the Mechanical Equivalent of Heat.

The most important generalization in physical science in the nineteenth century was the doctrine of the Conservation of Energy, and in establishing it, it was necessary to inquire into the very nature of heat,--whether it was a substance, which had been named "caloric", or simply a "mode of motion". About the middle of the century Joule produced convincing evidence that the latter view was the correct one. From numerous experiments he deduced the result that the quantity of heat required to raise the temperature of 1 lb. of water through 1 Fahrenheit degree is equivalent to 772 ft.-pounds of mechanical work. Joule was the proprietor of a large brewery, but practically all his life he devoted himself to scientific research. Joule's achievements have been recognized by choosing his name for the 'practical' unit in mechanics:

1 watt of power in 1 sec. does 1 joule of work.

We are more accustomed to kilowatt-hours than to watt-seconds i.e. to joules. By an easy calculation, 1 Kwh = 3,600,000 joules. Joule was slightly deformed in body and so his statue represented him sitting in a chair.

Then there was a statue (by Chantrey) of John Dalton (1766-1844) the founder of the atomic theory of modern chemistry. Also, one of the mural paintings shows Dalton with a stick stirring a pool of stagnant water while a boy holds an inverted bottle to catch the marsh gas as it rises from the bottom. There were statues and



pictures of other persons too, but this honour shown to Manchester's own men of science was very pleasing to me.

On Sunday morning my wife and I walked over to hear Dr. MacLaren, the widely-known Baptist preacher. His large church was comfortably filled and we were glad to listen to his 40-minute sermon.

Monday, August 1, was a Bank Holiday, although why it was so I could not determine. The citizens generally celebrated it enthusiastically. There were excursions on the railways to the seashore and to other holiday places. During the day some eleven of the Laidlaw connection took a trip of about fifteen miles southward to Alderly Edge in the county of Cheshire. Six of us were in a wagonette while five of the more youthful ones went along on bicycles. This, I was told was a favourite location for the residences of wealthy 'Manchestrians'. We admired the fine houses, some of them with the characteristic black-and-white timbering.

My wife and I wished to see London together, so at 3.30 p.m. on Tuesday we took a L. & N.W. train, which went through without change. Carriage good, roadbed excellent, but we were half an hour late on arriving. We drove to 11 Craven Street and were able to secure accommodation. My friend Carruthers was still at this house. He had been moving about London, and among other places had visited Highgate Cemetery. While there he picked for me some ivy leaves from the grave of Michael Faraday (1791-1867). These, when I reached home I put (under the glass) around the framed portrait of this great experimental scientist. The portrait still hangs on my office wall.

We spent three days in the big city, and what did we see?

1. Westminster Abbey. Soon after we entered, the vergers were making preparations for the choral service at 11 o'clock, and we attended it. Then we explored the Poet's Corner. All through the Abbey there were statues, busts and plaques of the nation's most distinguished men and women. In the Poet's corner were memorials of the greatest writers, but there were included some, chiefly from previous centuries, who seemed



hardly worthy of the honour. Then we were conducted through the Chapels in which the great nobles and kings are buried; and there are memorials to many others who served their country well. We also noted the Coronation Chair, under the seat of which is the famous Stone of Scone, brought to London by Edward I in 1297.

2. We went to Kensington Gardens and Hyde Park, but were too early for the show on Rotten Row. From here we went to Regent's Park and saw the Zoo, which was located there at that time. The lions, giraffes, etc., were very interesting, likewise the monkeys and kangaroos.

3. Regent Street and Picadilly. On one day we inspected the store windows. Next day we went again and bought a little parasol and a dress for our 3-year old whom we had left behind in Manchester. These were noted possessions around our house for several years.

4. National Gallery. The chief item to me was the Raphael Madonna for which £70,000 was paid in 1884; but it was not as satisfying as his Sistine Madonna at Dresden. The masterpieces by Landseer, Reynolds, Romney and others pleased us greatly and made us proud of the British painters.

5. St. Paul's Cathedral. We admired the Dome and the various monuments. Going down into the Crypt, we were specially interested in the tombs of Nelson and Wellington. I recalled Tennyson's "Ode on the Death of the Duke of Wellington" (published in 1852) from which an extract was given in the old Fifth Reader:

[Nelson speaks]

Who is he that cometh, like an honour'd guest,  
With banner and with music, with soldier and with priest,  
With a nation weeping, and breaking on my rest?

[The Poet replies]

Mighty Seaman, this is he  
Was great by land as those by sea.....

6. The Tower. Of course we <sup>gazed upon the Crown Jewels, but not with envious</sup>  
<sup>eyes.</sup> The Armoury with its coats <sup>of mail, its pikes and spears and other accoutrements.</sup>  
of mail, its pikes and spears and other accoutrements.



of war of ancient days was more interesting. Then we went into the chapel of St. Peter ad Vincula, where many beheaded notables were buried; and in the Beauchamp Tower we read inscriptions by Dudley, Lady Jane Grey and others.

7. British Museum. This was the most attractive of all that we saw. The historic autographs, illuminated books, Egyptian mummies, ivory carvings, vases, ancient gold ornaments and famous marble sculptures, were all of the greatest interest. It fulfilled our highest expectations.

We left London by the Midland Railway at 4 p.m. and arrived in Manchester (190 miles) at 8.25.

We visited the Owens College Museum, which was devoted chiefly to geology and mineralogy. I thought ours in Toronto quite as good. I also found a number of good second hand book shops and purchased a number of volumes of value to me in my work in physics. Nothing pleased me more than to pick up a book which I had been looking for, perhaps for years. Characteristically in Manchester, I was able to buy a good set of drawing instruments for £3 10s. They were not made in England but in Germany, which did not influence me. The British dealers were quite free and willing to impart goods from another country in competition with those made at home, and the manufacturers did not ask for a high fence to keep the other nations' goods out. I am sorry to say that my drawing instruments were carried off by a burglar who entered my house during the summer holidays in 1920.

We thought it was time to move on to Scotland to visit the rest of our relatives. At 10.02 a.m. (August 10) we left Exchange Station in a carriage billed for Edinburgh. Between Manchester and Wigan and also in the neighbourhood of Preston (all in Lancashire), there were numerous tall chimneys and coal mines as indicated by the two pulleys spinning about at the top of the shaft. At Carlisle (119 miles), still in Cumberland but near the county of Dumfries, Scotland, the long train was divided into two sections, the first going on to Edinburgh, the second



to Glasgow. We soon reached Lockerbie, our destination (146 miles). We were met at the station by cousins James and Lizzie, who took us to the home of their father Thomas Laidlaw, nearby.

Next day (Thursday, Aug. 11) there was what I thought a typical Scottish performance. Cousin James, who was employed in Glasgow, was home for a few holidays, and he had arranged to join a couple of friends in a day's fishing in the Annan River near Ecclefechan, where Thomas Carlyle (1795 - 1881) was born and is buried, and I expressed a wish to go with him. We took train to Ecclefechan station, which is a mile from the town, and walked two miles westward to the river. It was raining when we started, but when about half a mile from the river the water came down in torrents. We took shelter under an oak tree. I had an umbrella, the others had rain-coats. The river, or at least the fishing rights, were owned by Brooks, manufacturer of machine cotton, and at the Lodge the men secured their licences to fish - 2s.6d. for the day. They put on their long waders and started to whip the stream. My boots were wet but I followed along the shore to watch the show. I saw James catch two herling (young sea trout) and then, about 10.30, I left for Lockerbie, walking the  $5\frac{1}{2}$  miles in 1 hr. 40m. My feet were wet but with no ill results. The day cleared in the afternoon and James caught five little fish in all.

But the fish which are caught in Scottish rivers are not all little ones, a few ounces in weight. In 1938, - on our last trip abroad - my wife and I were in Lockerbie again. James's youngest brother, Andrew Laidlaw, who had a chemist's shop and who likewise was Provost (i.e. Mayor) of the town, took us over to the Town Hall and showed us two salmon, stuffed and mounted on the wall, which he had caught, with rod and line, in the same Annan River, and which weighed  $48\frac{1}{2}$  and 46 lb. respectively. Andrew was 78 years old in 1949.

Next day we made a pilgrimage eastward to Eskdalemuir, to the old Holm Farm where the Laidlaw family were brought up. The party consisted of my wife Jean, Miss Moffat, an old friend of the family, Uncle Thomas and myself, and we left by wagonette at 9.30 a.m. At first the drive was along an avenue of beech trees which met overhead and there were hedges on each side. At Boreland we



alighted and visited the churchyard where the Laidleys and Laidlaws of old are buried - as far back as 1730. Then we started again and soon came to the bare sheep-hills which hemmed us in on every side. The road was good and the views awe-inspiring. About 12.15 we reached the Holm. We had tea in the old kitchen. I took some photographs of our part and the Holm, and also of two tombstones erected in memory of relatives. We left at 2 o'clock and reached home in 2½ hours. A very pleasing and historic trip.

My wife's mother, Jane Lindsay, had been born and brought up at Laurieston in the adjoining county of Kirkcudbright, and we had promised to look up her relatives and old friends. So at 10 o'clock on Saturday we left Lockerbie by train for Dumfries (14 miles). This is the chief town in S.W. Scotland and is full of associations with the poet Burns, who is buried there. Then we went on 20 miles to Castle Douglas, the market town of the district of Galloway, which includes the counties of Kirkcudbright and Wigtown. This place was of interest to me through its connection with James Clerk Maxwell, one of the greatest physicists of the 19th century. He graduated B.A. at Cambridge in 1854, and in the interval 1860-70 he lived at Glenlair, seven miles from Castle Douglas, on the old Maxwell estate. Here he occupied most of his time in composing his famous treatise on Electricity and Magnetism which was published in 1873. He was called from his retirement to be director of the new Cavendish Laboratory at Cambridge, which has become so famous since then. A

At Castle Douglas we took the stage at 1 o'clock to Laurieston, which we reached in about an hour. We had been warned at Castle Douglas that no one would accommodate us over night, but it was suggested that we try Mr. Hill, the grocer. However, he could not take us, nor could John Murray, proprietor of the inn. Then we went on to a two-story white-washed house where the elderly Miss Kelvie lived. While my wife and daughter stayed in the 'trap', I knocked at the door. When the lady appeared I asked if we could secure lodgings for two nights. She shook her head and hesitated. "Well", I said, "we have come all the way from Canada to see this place; my wife is a daughter of Jane Lindsay who used to live here". I did not have to say anything more. "Yes, you can stay", she called out.

Strange to relate, Miss Kelvie knew my wife Jean's mother and grandmother;



also, it was Jean's grandfather who had built this house, and they all had lived in it! Afterwards she could not do enough for us. Word was passed around through the village and old friends of Jane Lindsay called to see us. Also, we were directed to the old farm, the schoolhouse (now the town hall), and other landmarks. Jane Lindsay was born August 27, 1935; she married George Laidlaw, on October 3, 1869, in Dunnville, Ontario; and she died on April 25, 1911, in Toronto.

Next day (Sunday) the sky was clear and the weather very pleasant. David Gibb called to see us. He was well acquainted with Jean's mother's people; indeed he and Jean's uncle were "cronies". "You're verra like yere mither", said he to Jean, "but nae quite sae bonnie". We called on John Murray at the inn and found that he was a cousin of Jean's grandmother. His wife was dead but his daughter Joan helped him to run the place. Right across the road was the old schoolhouse transformed into a town hall.

At 12 o'clock we went to the Free Kirk and heard Rev. Mr. Craig hold forth. There was an organ made in Vermont, U.S.A., by Estery, but no choir, and the singing was not inspiring. At dinner we had a duck obtained at the Grey Stone Farm specially for us. Jean and I called to see the Campbell's at the post office. They were relatives of our friends the Macrae's at Guelph, of which one son Thomas M.D. later became a distinguished physician, and another John was the author of "In Flander's Fields." We also called on Mrs. Cummins (Jeanie Sproat) who lived with William Sproat, Registrar. She was very kind and said she would willingly have given us a place to stay if we had called there.

Everyone urged us to remain longer, but we could not break our arrangements, and so we left at 9 o'clock next morning by wagonette for Castle Douglas. The Misses Murray, Miss Kelvie and other new-found friends were on hand to see us start. There was a full load in the little stage but we reached Castle Douglas in good time. At the post office there we saw Miss McVittie, a friend of Jean's mother, and at the station we met Mr. Lindsay of Lochenbreck Hotel and Mrs. McQuay, who was a friend of Jean's mother. Our visit to Galloway afforded us great pleasure. It was evident that when Jane Lindsay went to Canada, some forty-five years earlier, she left behind her many admiring friends.



We took the train at once for Dumfries, where we changed and had an hour to wait, and then we went on to Lockerbie which we reached about 1.45 p.m. As usual, our friends were at the station to see us, but we did not stop over there. Instead, we changed again, in order to go northward, and in an hour reached Symington ( $40\frac{1}{2}$  miles). Another change brought us to Peebles (10 miles), and after an hour's wait there we boarded the N. B. Railway for Walkerburn ( $8\frac{1}{2}$  miles) where we arrived at 6.10. Here Uncle Walter met us with the 'gig' and drove two miles to his big sheep farm, Holy Lee.

This was a new experience for us. The fine stone house was located half-way up the north bank of the River Tweed and the view from it was very pleasing. We were right amongst the heather-covered hills. Our uncle was tall and inclined to be reticent, and his wife, Aunt Kirsten, was unconventional in her ways, preferring to look after the "critters" (lambs, hens, etc.) outside to bothering with some things withing the house. She was well read and they both were very kind to us.

For two days there was much mist and rain and I did little but read "Tales" by James Hogg (the Ettrick Shepherd) and the good literature found in "Chambers's Journal". Indeed I learned that William (1800-1883) and Robert (1802-1871) Chambers were natives of nearby Peebles, to which town the former presented the Chambers Institute. Between showers I walked in the garden and ate big ripe gooseberries and some strawberries. One bright afternoon my family attempted to climb the steep hill at the rear of the house. We found it hard going, and not far from the top the other two decided to go no further, but I went on to the highest ridge. The view was beautiful. I could see far along the valley and over the other hills. At the foot of the hill flowed the picturesque river, and the towns and villages of the surrounding country were famous in Scottish history or literature. The highway ran close along the north bank of the river and the N. B. Railway followed its course on the other side.

The time came for us to move on. Our next stopping place was Glasgow. Friday morning was dark and threatening, but at 8 a.m. my wife and daughter and I climbed into the gig and were driven to Walkerburn. Uncle Walter and Mr. Grieve,



a neighbour, had walked there ahead of us. We all took the train for Peebles and on arrival we all walked up to the Auction Mart. The various flocks of sheep had been driven to this place and were being gathered into their proper pens for sale, but we could not wait to see how it was carried out. Uncle Walter went with us to the Caledonian Railway station. The train took us back to Symington (19 miles), to Carstairs Jet. (7 miles) and thence to Glasgow (27 miles), in all 53 miles, and we arrived at 12.45. Here we were met, as usual, by Uncle William and Cousin Madge. The former went back to his place of business at 100 St. Vincent St., a few blocks away; the latter accompanied us in a cab to their lovely home at 12 Bruce Rd. in Pollokshields. We had come to visit the remaining member in the circle of my wife's uncles, the youngest of the large family.

I was pleased to be in Glasgow. Its population of 800,00 made it the second city in the kingdom; and it was the rival of Manchester in its manufactures and of Liverpool in its shipping. I had heard much about its municipal government, how the Corporation owned and efficiently managed its gas-works; its water-supply, obtained in abundance and purity from Loch Katrine, 42 miles away; its transportation system, under the ground, on its surface or on the River Clyde; also, how it had established model lodging-houses, public baths and wash-houses, and had improved the sanitary conditions of the city.

The site of the city and its suburbs is rough, uneven and picturesque, while within a 50-mile radius there are hundreds of islands, lakes and rivers, unequalled in natural beauty as well as romantic history, and thus very attractive to the tourist.

Two days after our arrival we made an excursion to Loch Lomond. The party consisted of Cousin Madge and the three of us. We left at 10.15 by the Caledonian Ry. We got outside of the city by a tunnel and went along the north bank of the Clyde. We were astonished at the number of ships under construction. At 16 miles on our way we came to Dumbarton, which is commanded by a famous castle high up on a rough rocky hill. Five miles farther on, at Balloch, the train ran on to a pier at the south end of Loch Lomond, which is 25 miles long, one to five miles wide, and is one of the most beautiful and most famous of the Scottish lakes. Here we



took "The Queen", which threaded its way among the many well-wooded islands, and finally came to Tarbet, where the loch is only a mile wide. A mist enshrouded us, but we could make out the banks of the loch towering up on both sides. Ben Lomond, which is 3200 feet high, is on the east shore, and some passengers stopped off here a day in order to climb it. We had dinner on board. From Tarbet we were driven in a fine 'four-in-hand' two miles westward to Arrochar, which is at the north end of Loch Long. This long narrow lake is not completely surrounded by land, but is open at the south end where it emerges into the Firth of Clyde. The little drive was one of the most charming we ever had. At Arrochar, we transferred to the "Lady Rowena" which took us southward to Dunoon where, all in a Scotch mist, we changed to the "Columba" and crossed the Firth of Clyde to Gourock, a terminus of the Caledonian Ry., which carried us back to Glasgow. We got home at 6.45, after a very enjoyable trip.

A few days later we had another fine outing, the party on this occasion including our gracious Aunt Jane. We took train at 10 o'clock for Greenock, where we went aboard the "Juniper" a fine new steamboat. We went round the island of Bute, going up the west side, through the Kyles (i.e., strait) of Bute, then southward as far as Whiting Bay on the east coast of Arran. Here we turned right-about and went back by way of the east coast of Bute, passing Rothesay, Dunoon, Innellan and some other small towns much patronized as summer resorts by people from Glasgow. We had dinner on board, the scenery was very interesting and the weather was perfect!

On another day Jean and I went to Edinburgh (47 mi.). Immediately on leaving Glasgow is a long tunnel and a very steep grade up which the train is pulled by a cable attached to a stationary engine. This indicates again the mountainous nature of the country. On the way we passed Linlithgow, long the residence of the Scottish kings and where Queen Mary was born in 1542. Edinburgh is famous for its romantic beauty, its renowned university and schools and its great printing and publishing business; and perhaps one should include its production of Scotch whiskey. Its population at the time was 261,000, - far below that of Glasgow. I was told that when one of its citizens was asked which was the greater, Glasgow or Edinburgh, he replied, "Weel comparateevly, Edinburgh".



We first visited the famous Castle and were shown its various features. The rock on which it is built is approached on a moderate incline on the east side, but on the other three sides it drops away almost perpendicularly. From its summit the views were beautiful.

Next we went to St. Giles Church and saw where Jenny Geddes in 1637 threw her stool at Hannay, Dean of Edingurgh, when he attempted to read the obnoxious Liturgy prepared by Archbishop Laud for the Scottish Episcopal Church.

In the afternoon we went to Calton Hill from which is obtained a fine view of Princes Street and which is a prominent feature of the landscape when seen from that incomparable thoroughfare. On its summit is the National Monument, which was designed to commemorate the services of Scottish soldiers in the Peninsular War and the Victory of Waterloo. It was never completed. Its impressive huge pillars suggest the Acropolis of Athens, and some persons think that in its unfinished form it is of more arresting interest than it would have been in its entirety. Near it is a "spy-glass" monument to Lord Nelson, 102 feet high.

Then we walked to Holy Rood, a most interesting place. It was the residence of the Scottish kings, dating, in its present form, from 1670-79. We saw the rooms occupied by Mary Queen of Scots and I took a photograph of her bedroom.

We realized that there were many other attractive and important things to see but we could not take time to do so.

As we had promised, we took tram northward to Newhaven Road, near Leith, to call on Mrs. Jackson, sister of Aunt Margaret of Manchester; and on our return we got a train at 6.50 p.m., which delivered us in Glasgow soon after 8 o'clock.

In Glasgow also there were still many interesting things which we should like to see, but we had to limit ourselves to a few of them.

One afternoon my uncle and I visited the Royal Botanic Gardens, in the north-western part of the city. The two things which interested me most were a fine big passion flower, and a fuchsia like a tree, about 12 feet high, with a stalk  $1\frac{1}{2}$  inches in diameter. I was told that in some places there were hedges of fuchsias. Ten years later I saw something of this sort in Golden Gate Park in San Francisco, California. The Kelvin River flows through these Gardens, and a little farther on it runs past Gilmour Hill on which magnificent site, the finest



in the city, are the buildings of the University of Glasgow. The University was founded in 1450. Its former site was taken over by the N. B. Railway for a 'goods' station, and the University was moved to its present location in 1870. Naturally I compared its splendored stone buildings with our own University Main Building in Toronto, - and not greatly to our disadvantage. When I was an undergraduate at Toronto there was a little stream, known at the Taddle, flowing through the University grounds, but now entirely underground; in Glasgow the Kelvin burn was not hidden away but was allowed to move freely along and join the Clyde half a mile farther on.

One other afternoon my uncle and I went to see the shipping and the shipbuilding on the River Clyde. We took a "Clutha" (which means Clyde), a city ferry which runs up and down on the stream, a penny each way. We marvelled at the docks filled with ships destined to ports all over the world, while even more wonderful were the shipyards where ships were ween in all stages of construction. The first steam engine was built at Glasgow by James Watt, a native of the town, in 1763; and the first steamship in Europe plied on the Clyde between Glasgow and Greenock. The river was dark and muddy and somewhat "smelly", but the whole scene was remarkable. At some points there were shipyards on both sides of the river and the din of the hammers was really terrific, but not bad enough to deafen one, as I had been warned.

A feature of the city transportation system which I admired was the District Subway, which was completed in 1896. Its course was roughly circular around the west portion of the city. There were two tubes, side by side,  $6\frac{1}{2}$  miles long, and the trains were propelled by steel cables. There were 15 stations. For four stations the fare was 1 d., all round, 2 d.; trains every four minutes. It was speedy, cheap and safe.

Glasgow had a number of good second hand book shops, I was pleased to discover, and I 'picked up' several volumes of value to me and at reasonable prices.

Our visit to Glasgow and Edinburgh had been full of interest and pleasure, but the time came to leave. I think I should here speak further of my uncle, the stationer. William Park Laidlaw was born at the Holm Farm in Eskdalemuir on July 22, 1844, the youngest of the large family. At the age of 16 he went to



Glasgow, and a few months after his arrival he entered the employment of a stationer. Seven years later his employer died and he took over the business, and he was active in carrying it on until 1937. During that time he saw the quill pen give place to those of steel, with fine or stub points, and finally he saw them displaced by the ubiquitous fountain pen in its various styles, colours and prices. He said the last end was better than the first. He was one of the founders of the Glasgow Rotary Club in 1912, and until 1945 was a regular attendant at its meetings. On his 100th birthday he received a telegram from the King and congratulatory messages from Rotarians all over the world, including the United States and Canada. He died July 14, 1946, just one week before his 102nd birthday.

We left Glasgow at 2 p.m., Monday, Aug. 29, and reached Manchester in the evening. A hansom soon delivered us at 106 Carter Street, where we were received again with abounding kindness.

The time was approaching for us to set sail for home, and we utilized most of the remaining days in making last calls on our numerous relatives; also in gathering together our luggage and the things we had accumulated, and in packing them into our "boxes" and valises.

But we found time for two little excursions. One was in the one-horse wagonette of Mr. Fulton, proprietor of the Denmark Hotel and a friend of my three uncles. He insisted on doing us a favour, and so came along at about 2.30 one afternoon. In his carriage the seats ran lengthwise and the passengers faced each other. There were Uncle Richard, Aunt Margaret and the three of us. We went through Eccles and other villages. We stopped a few minutes in Patricroft to call on a Laidlaw of the family in Lockerbie, and then went on through Stretford and Sale. In our leisurely travel we could really see these interesting places - instead of rushing through them at modern automobile speed.

The other trip was to Buxton in Derbyshire, about 25 miles southeast of Manchester. This is a famous health resort. With its elevation of 1000 feet above the sea - the highest of any town in England - it has a bracing climate. Also it has hot springs with a constant temperature of 82 degrees F. The only other hot springs in England are at Bath, in Somersetshire, and both places were well known to the Romans.







She cleared at about 4.15 o'clock, and then our ship, the "Yorkshire", was pulled in alongside the dock. At first she seemed very small compared to the "Canada", but on getting nearer we found she was not a miniature ship. She was 400 feet long, 42 feet wide and was drawing about 20 feet of water. Her tonnage was 5000.

By regulation, only passengers were allowed on the inner dock, but my uncle slipped a shilling into the hand of a big policeman guarding one of the gates and asked him to look the other way. This he did, we scuttled past, and soon were all on board the ship. Our stateroom was No.19 and we quickly located it. We were pleased to find it commodious and clean, with three port-holes giving good ventilation. Here we had to say our good-byes. We felt we had met many dear and loving friends. We were proud of the Laidlaw clan! We had been treated with great kindness and would always cherish their memory.

Then the whistle blew, warning that we were about to leave. Our friends went ashore, and tugs pulled us out into the Mersey stream. As we moved away we watched the throngs on the dock as it slowly receded from us. We could distinguish our party for a long time. Uncle Richard held his hat high up on the end of his walking stick, and the others waved their handkerchiefs. At last they became indistinguishable, and we turned to look about the ship.

I met an officer and asked about the hours for meals. He said he did not know them, that he was making this trip as the ship's doctor. His name was Anderson and he lived in Liverpool. For a holiday, he said he often spent a month in this way. He sat next me at the table.

The cabin list was distributed at the first meal, - dinner that evening. On it there were 48 persons, and I noticed that McGill University was well represented. During the twelve days of the voyage I became acquainted with most of the passengers. They made up a varied assortment, as will be seen from the following notes:

Mrs. Barwick and child. Had lived in B. C.; now bound for Montreal.

Mr. G. B. Bleeker. A merchant and the C.P.R. ticket agent at Marmora, Ont. Went to England with a sick man.

Mr. R. A. Brock. Son of W.R. Brock, a well-known Toronto merchant, who lived on the east side of Queen's Park, where now the big East Block stands.



Had been in England and Scotland bicycling and for business.

Miss Cartier. A French lady; had spent two years in Paris studying music.

Mr. and Mrs. Chant and Child.

Mr. Coles. Very quiet, good at checkers.

Rev. Father Corcoran. Bound for Hamilton. Could take a hand at the cards or a pull at his pipe.

John Cox, Professor of Physics at McGill. Mrs. Cox, very tall.

Master Jack Cox, not very sturdy, helped by the visit to England.

Mrs. Cross.

Sister Ella Curnock. A Methodist deaconess, bound for Hamilton; very helpful.

Mr. A. E. Ellis, of St. John, N. B. Had some silks in his trunk!

Mr. Michael Farrell.

Dr. F. Finlay and Mrs. Finlay. Professor in McGill Medical Faculty.

On his wedding tour. Bringing home a 'grandfather' clock bought for £5 (pounds).

Mr. E. N. Heney, of Montreal. About 50, short, pleasant, well-informed business man.

Dr. J. A. Hutchison and Mrs. Hutchison. Chief G.T.R. surgeon. Home was in Goderich. Well informed, had been touring Europe.

Mrs. Keene.

Mr. J. B. Kenny, a Halifax lawyer.

Rev. R. Labelle, Mrs. Labelle, Mr. Cyrille Labelle, Miss Alice and Miss Leonie Labelle. From Sorel. Had been away for three months. Suffered from sea-sickness.

Mr. G. Mahon and Mrs. Mahon. Bound for B.C.

E. W. McBride. Professor of Biology in McGill. Claimed to be English, but talked like a dogmatic Irishman. Argued on all sorts of questions.

Mr. James McDonald. Retired Indian Army surgeon. Had seen many parts of the world; coming to Canada for his rheumatism; very entertaining.

Mr. Douglas. Mr. John D. Meikle.

Mrs. Robertson. Wife of a Montreal traveller; well acquainted with Toronto.



Mr. E. Rutherford. Appointed to succeed Professor Callendar in McGill.

A New Zealander; held an 1851 Exhibition scholarship at Cambridge for three years. Good man, still young. A few years later he returned to England and ultimately became Lord Rutherford, director of the famous Cavendish Laboratory at Cambridge. (d. Oct. 10, 1937, b. 1871)

Mr. Karl Seligman. Teacher of German in a preparatory school in Chicago. Agreeable man to meet.

Mr. James A. Vallentyne. Pupil of Seligman; about to enter Yale University.

Mr. W. Stirling. Mr. F. St. Louis.

Mr. Geo. F. Taylor. Traveller for Gourlay, Winter and Leeming, a music firm in Toronto. Not a good sailor.

Miss Turner (6 ft. 1 in.) and Miss Ethel Turner. Slightly flirtatious; bound for Toronto.

Mr. R. J. Walker. A traveller. Friendly to our little daughter.

Rev. B. G. Wilkinson, of Bishop's College, Lennoxville, Quebec.

Mrs. Wilkinson, troubled with sea-sickness. Master F. Wilkinson, about 14, the same.

On the first day there was very little sea-sickness, but on the next, few were on deck. Two days later nearly all had regained their equilibrium and were able to endure the heavy dead winds which gradually increased to a gale. The waves seemed mountain-high, and with the rolling of the ship the steamer trunks and other goods slid across the floor of the staterooms. On one day we made only 166 miles instead of the usual 300. As the ship "pitched" up and down, the propeller would come out of the water, and to prevent the engine from "racing" a man stood at the throttle and turned the steam off and then on again. We passed through the Strait of Belle Isle on the afternoon of the ninth day out. From there we made all possible speed but met several delays, - picking up pilot, stopping at Quebec, pilot's ignorance and fog. But on Tuesday, September 20, early in the morning we approached Montreal. Having passed the Customs with all due speed, we took a cab to the G.T.R. station and arrived at 9.10 - ten minutes too late!



In the afternoon we took the drive up on Mount Royal, Sister Curnock with us, and the magnificent view over the city and the noble river almost compensated us for our delay. After this drive the three of us went out to 103 Irvine Avenue to call on Mrs. Hart at whose home, when I was a student at the University, in Toronto I was privileged to live. We had supper at Alexander's Cafe and took the 8 o'clock train for home. We arrived in Toronto next morning sharp on time.







Jan. 1950.

XI. WIRELESS TELEGRAPHY

At the end of my lecture on Electric Waves on February 15, 1896, at the University, I called attention to the fact that the discovery of electric waves and the demonstration of their nature was a striking example of pure scientific research. First, Faraday made his pioneering investigations in electricity; then Maxwell endeavoured to express in mathematical form Faraday's experimental results, and thence he deduced a broad fundamental relation between electricity and light; and finally Hertz, with peculiar insight and outstanding experimental skill, demonstrated that that fundamental relation actually existed, and that light was really a branch of electricity. He produced electric waves and showed that they were propagated through space, reflected, refracted and polarized just as light waves were.

I also remarked that I was pleased to exhibit to my audience these new and remarkable results, which, although of the utmost importance from a theoretical point of view, had no immediate connection with the practical applications of electricity, - nothing to do with the revolving wheels of street cars or of industry.

I showed my experiments to my regular classes in electricity and light at the University, and also to various outside bodies. Among these were the members of the Y.M.C.A. of the Grand Trunk Railway, on February 24, 1899; and the Ontario Educational Association on April 5, at its Easter meeting that year.

Of course I was continually trying to improve my apparatus, - to obtain an oscillator which was more efficient in sending out electric waves; and to secure a receiver which was more sensitive and dependable in detecting them. In this way one hoped to transmit signals over greater distances and with certainty.

It was quite evident that this method of transmitting signals might have a commercial application. However I did not undertake any serious experimenting along this line, but I was much interested in reading reports coming from other countries. I may say that researches on electric waves were carried on in all parts of the civilized world.

In Italy Augusto Righi (1850-1920), professor of Physics at the University of Bologna, was making notable experiments on electric waves, and he devised an oscillator which he reported to be very efficient. In my apparatus I used a



polished brass sphere with two knobs at the end of a diameter, which were joined to an induction coil. Righi's oscillator contained two metal spheres held near together in a cell filled with oil so that the space between the spheres was in the oil and other parts of the spheres were in the air. Two metal knobs at the "ends" of the two spheres were joined to an induction coil which when in action caused sparks to pass between the spheres, and this generated electric waves which were thought to have a wave-length about four times the diameter of the spheres.

Righi had a student named Marconi (1874-1937), whose father was Italian, mother Irish, who had been experimenting with electricity almost from childhood. On learning of electric waves, in 1895 he definitely set out to send messages through space by means of them. In that year he was successful up to a mile. In 1896 he went to England and showed what he was doing to Preece, the engineer-in-chief of the British Postal Telegraphs. At this very time Preece was busily engaged in perfecting an induction method of sending signals which he had invented, but he cordially received the young man and gave him much assistance in his experiments. In that year he sent signals up to 12 miles. Marconi found out that his oscillator was more effective if he joined one knob to a vertical wire (the antenna) and the other to earth, cut out Righi's two spheres and the oil, and allowed the sparks to pass directly between the knobs. This was a new oscillator altogether, and the waves, instead of being a few inches long, were measured in scores of yards. The receiver used was a special form of coherer and it also became more efficient if its two terminals were joined one to an antenna and the other to earth. In 1900 signals were transmitted up to 200 miles from Cornwall, and in 1901, December 12, signals sent from Cornwall were received in Newfoundland. Marconi was very successful in establishing wireless telegraphy on a commercial basis, but his achievements were of a different class from those of Hertz. He was an inventor and exploited Hertz's original discovery.

At the request of Sir Frederic Stupart, the president of the (Royal) Canadian Institute, I lectured on Wireless Telegraphy to that body at the regular Saturday evening meeting on November 25, 1899. I took great pains to have made a Righi oscillator with solid brass spheres accurately 4 inches in diameter, and used a large induction coil. Also, to accentuate the telegraphic idea, I borrowed



from Mr. A. B. Smith of the G. N. W. Tel. Co. a Morse register and a relay, such as were at one time used in many country telegraph offices. The hall of the Canadian Institute building at 58 Richmond Street East was crowded. By means of the electric waves I rang a bell outside the room; and I sent Morse code messages across the room and recorded them on a strip of paper. The President, being an old telegrapher in the Meteorological Service, was happy to take a hand in this part of the evening's experiments. The whole performance was very successful. I was conscious that I had presented the subject in an understandable way.

On the afternoon of the Thursday before my lecture, G. R. Anderson (afterwards for many years on the staff of the School of Science) and I were testing my apparatus for it. We were working in the big lecture room in the west end of the "Main Building" and were sending messages from one side to the other. A Mail and Empire reporter called at the office of President Loudon, who brought him down to see our operations. His report in the newspaper was headed "Telegraphing without Wires" and he remarked that the first word recorded on the Morse register was "University". Incidentally, I still have the original paper ribbon in a scrap book.

On May 30, 1933, on the eve of my birthday, when the David Dunlap Observatory was under construction, I had a call from a reporter of the same newspaper who apparently had come across the old report. In an account of the interview, which appeared on June 1, was a reference to the performance a generation earlier and although we had travelled far in 'wireless' ~~XXXXXXXX~~ in the meantime I corroborated the statement that our messages were the first sent by wireless telegraphy in Canada.

I may say that in the college session of 1900-01 I carried on researches in wireless telegraphy at Harvard University. This I shall refer to later.

Lee De Forest (b. 1873), a talented graduate of Yale University, B.S. 1896, Ph.D. 1899, had an important part in the development of wireless telegraphy. He was fertile in inventions, the most valuable of which was the audion amplifier (1920) which made possible long distance transmission of music and speech, - or modern radio.

There was a De Forest Wireless Telegraph Company in the United States, and in the spring of 1903 De Forest came to Toronto to organize a company in Canada. A number of Torontonians became interested in the Company, and attempts were made to show what wireless telegraphy could do. Stations for sending and receiving messages



were established on the water-front in Toronto and Hamilton. As I was known to be interested in the subject I was drawn into association with De Forest and his helpers. For sending messages they used a small induction coil producing sparks between two knobs, one joined to an antenna, the other to earth. The discharges between the knobs were regulated, as to time, by an ordinary telegraph key which sent out Morse dots and dashes. The receiver was very simple. From two metal uprights about 2 inches apart in a base-board there projected in the same direction two pieces of steel wire (portions of a knitting needle) and across them was laid a piece of graphite, such as in a lead pencil. One upright was connected to the antenna, the other to earth. Thus a current of electricity might come down the antenna, go along the graphite and then down to earth. Electrical oscillations also might move up and down along this path. The operator sat in front of this little apparatus, with a telephone receiver strapped on his head, and the two wires from the receiver were joined one to each upright post. When the electric waves arrived from the sending station there would be oscillations in the receiving antenna and as they surged back and forth over the graphite they would be detected in the head-telephone. I don't recall that there was any battery in the receiving circuit.

Soon after these operations began in Toronto the annual *Conversazione* of the University College Literary and Scientific Society was held. The date in 1903 was March 19, and the president of the Society was my friend James Brebner. As usual, the different scientific societies prepared elaborate exhibits illustrating the work of the various departments. I undertook to give demonstrations of wireless telegraphy in the West Hall. The University possessed an experimental set of the Braun-Siemens & Halske system which I had obtained from Germany and used in teaching the subject Electricity. By it signals were sent out and received. Also the De Forest Company set up stations in the East and West Halls. Messages could be sent out in one and received in the other. This was very effective.

As the evening wore on and the hour for refreshments approached I received the following message from my wife. The regular telegram forms were used. These were on pink paper and the message was called an "aerogram". De Forest told me he had registered this name for his company's messages.



Received the following Aerogram

March 19, 1903

To Mr. Chant,

When do you sup?

Jean.

Later in the evening came the following from the President of the Society:

To Dr. C. A. Chant,

March 19, 1903

Thanks for your part in the night's success.

J. Brebner.

On April 16 I received by 'wireless' the following message from a teacher in Hamilton who was a fellow-student at the University and graduated in the "M. & P." course in 1889. It probably refers to a demonstration before the Ontario Educational Association at its Easter meeting. Easter Sunday was April 12.

To Prof. Chant,  
University of Toronto.

Hamilton, Ont., April 16, 1903

Enjoyed your demonstration on wireless telegraphy yesterday. How do you know the wave-length that an induction coil sends out? Could you not do without antenna? Would like an answer.

James Gill.

On June 13 there was a public demonstration of sending messages between ship and shore. Mr. Thomson, the provisional president of the Canadian De Forest Company, was on the steamship Modjeska which ran between Toronto and Hamilton. I sent a message of congratulation to him when the ship was about 20 miles from Toronto. From the ship came back the following message:

To Dr. Chant,

June 13, 1903

Read message to Mr. Thomson; and consider my elation at knowing that you are one of the party partaking of our humble accommodation.

E. Callaghan (operator)

It was early recognized that the most useful field for the telegraphy was to transmit messages between a ship and the shore. A message from a ship in distress might save the ship and all on board. So the De Forest Company proposed to establish stations at strategic points on the great lakes. As a beginning, one in the neighborhood of Sault Ste. Marie, which would serve Lakes Superior, Michigan and Huron,



was suggested; and I was asked to assist in locating a suitable site. But the project did not go much farther. The entire method of signalling with Hertzian waves was still in the experimental stage and improvements in apparatus caused old instruments to be discarded after a year's use. The Company was not strong enough to carry out its programme of operations. Not many years elapsed, however, before wireless installations on board ships and on shore were in use. It was not unusual for capable students to find employment in summer as wireless operators on the lake boats.







### XII. A Year at Harvard

When I was a boy I thought it odd that the day on which a student received his B. A. degree at the University was called Commencement Day. I thought it should rather be Termination Day or Completion Day. However before the occasion arrived for the ermine-trimmed hood to be thrown over my shoulders and for me to be admitted "ad gradum", I had realized that the name was quite appropriate, - the time had come to leave the 'ivory tower' and commence the work of life.

During the year and a half I was in the Civil Service I did not cease to be a student, and upon returning to the University I felt even more strongly the necessity of carrying forward my studies.

#### Graduate Work

While I was Fellow in Physics my time was largely occupied with the work of instruction, but I felt a narrowness in my attainments and a necessity to increase my knowledge so as to be better able to answer the inquiries of the students.

I devoted all available time to reading magazines and recent books, in order to become familiar with late discoveries and developments. When I was appointed to the permanent staff in Physics I continued this programme even more earnestly. It was in doing this that my friend G. F. Hull and I began the serious study of German, with the immediate desire to read the recent discoveries of Hertz on electric waves.

#### Visit to American Universities

In February 1893 I took a few days off to visit several American Universities which were well known for their encouragement of graduate study.

One of my fellow-students at the University of Toronto was Samuel J. Saunders. He was born at Nanticoke, a village in Haldimand county, Ontario, in 1862, took the M. and P. course in the University and graduated in 1888 with first class honours in Physics, along with John W. Macmillan, who became well known as a Presbyterian, (later United Church) minister. Saunders excelled in experimental physics. He was appointed Fellow in Physics in Cornell University in 1888-89, and Instructor in 1889-92. He obtained the Sc. D. degree from Cornell in 1894. In 1892 he was appointed Professor of Physics and Astronomy in Hamilton College at Clinton, nine



miles southwest from Utica, N. Y. This was an old and reputable institution, and he held the position until 1934, when he became emeritus. At Hamilton College was Litchfield Observatory which was erected by subscription 1852-55 and which possessed a telescope with a lens  $13\frac{1}{2}$  inches in diameter - among the largest in the U. S. at the time. Of this, C. H. F. Peters (1813-1890) was director from 1858 until his death in 1890. On a July morning, he was found dead on the door step of the college building where he lodged. His observing cap was on his head and a half-burned cigar in his fingers, - apparently stricken on his way to commence the night's work. He was a man of great ability and wonderful industry; and he brought fame to his observatory by his many discoveries, among them being over forty minor planets. The management of this observatory was included in Saunders' duties.

I think I should remark that Arthur Percy Saunders, a graduate of the U. of T. in 1890, my own year, and one of the five distinguished sons of the first director of the Experimental Farm at Ottawa, was professor of chemistry at Hamilton College from 1900 for over forty years.

First, I went to Clinton, where I received a welcome from my friend of '88. He showed me over his high-class institution, of which he was proud. I was also interested in the Observatory. Among the things left behind by Dr. Peters were some engraved copper plates for maps of stars near the ecliptic, which he had prepared with great care and skill. In 1882, after twenty years' labour, he had published 20 charts of this series, but a few years later the photographic method of producing such maps of the sky came into use and completely superseded the old laborious way. Peters, indeed, was a member of a Commission which met in Paris in 1887 to organize a photographic survey of the heavens.

Saunders, of course, gave me an account of his experiences at Cornell; indeed a chief reason of my coming to see him was to get such information. His report was highly complimentary.

#### Visit to Cornell University

So next day I took train for Ithaca, about 90 miles away. I found the University in some confusion as the next day was Washington's birthday and hence a holiday. I was inquiring about a place to stay, and when it was learned that I was from Canada I was introduced to Thomas Hall, a young man from the S.W. portion



of Ontario who was a student there and who was a member of the senior rowing crew. Hall insisted that I must stay with him. I was interested to see how these athletes were set apart - almost dedicated - for the high task before them! They had a special table in the dining hall and submitted to rigid rules of living. I have often wondered what became of kindly "Tommy" Hall.

I had read the history of Cornell University; its constitution was very different from that of the U. of T. It had many innovations, presumably designed better to serve the surrounding country, and in general it seemed to favour the practical side of education.

I met several members of the staff in physics, including Edward L. Nichols, the head of the department. He explained to me the research he was then engaged on. It was in spectroscopy. He showed how he bored holes in the ends of carbon rods, filled them with the chemical salts he was investigating and brought the ends together to form an electric arc which he photographed through a spectroscope.

I found that a considerable portion of the lectures and also of the instruction in the laboratory had to do with dynamos and the practical side of electricity.

In the summer of 1893, a few months after my visit, with the support of Cornell University, Edward L. Nichols and Ernest Merritt began the publication of The Physical Review, "a journal of experimental and theoretical physics". It was very well printed and indeed creditable to all concerned in its production, but the actual output of physical research was not very great at that time. A few years later a physicist friend compared the Review to a little stream flowing between imposing banks. I have taken The Physical Review from its first issue, and now it may properly be compared to a mighty current. In addition there are several other journals devoted to special branches of physics (optics, acoustics, etc.), each with its own strong current flowing in its parallel channel, down to the ocean of scientific knowledge.

#### On to Cambridge

In the evening I left for Boston. I do not remember at what junction point I got back to the main line, but it was about 1.30 a.m. when the train came along. I was able to get a berth - the first in my life - slept well, and arrived in Boston between 9 and 10 in the morning. I boarded a surface street-car and in



an hour, or longer, was in Cambridge. At Harvard there were always in attendance several Canadians and I soon located one with whom I was acquainted.

He was Reginald A. Daly, who graduated B.A. in 1891 from Victoria College, then in Cobourg. He was born in Napanee but his home then was in London, Ont. We had several mutual friends and he had invited me to "look him up" if I should come to Cambridge. He was extremely kind to me. He explained the chief features of Harvard University, and took me to one of the students' scientific societies in the evening. Next day I was conducted by him about the grounds and the building<sup>s</sup> - the big Museum, the Residences, the Harvard Co-op. with its fine book department, etc. At the next Christmas when he went home for a visit he brought me 13 volumes of Rolfe's set of Shakespeare which I had asked him to get for me. I felt I had received through him a real understanding of the great University.

Daly received the A.M. degree in 1893 and Ph.D.(Geology) in 1896. He was instructor in Geology 1895-96 and Sturgis Professor 1912-42. In 1923 the U. of T. conferred on him the degree of D. Sc. (hon. causa). I was honoured in my friends.

#### To New York and Baltimore

A favourite route between Boston and New York at this time was by way of the Fall River Line of steamships. They plied during the night between Fall River, Mass., fifty miles south of Boston, and New York City, the total distance by land and water being about 230 miles. They were large vessels with numerous fine staterooms, inviting one to the quiet of the ocean.

So in the evening I left Boston by train and in an hour or more reached the dock at Fall River. There was a big crowd, apparently going to New York for the week-end. However I was able to get a stateroom, although I did not retire at once as the jolly party was having a happy time. At last all moved off to their rooms and everything became still, except for the big engines driving the ship forward and the waves beating on her bow. The sun was up on Sunday morning when we arrived at our destination.

I soon secured a lodging place although I don't remember where it was. The big city I found easy to navigate and during the day I visited a number of its great attractions, - the Aquarium, the American Museum of Natural History and the Metropolitan Museum of Art. In the latter I remember distinctly Rosa Bonheur's



"The Horse Fair". I thought New York City supplied many means to educate and entertain its people.

Next morning I went to Columbia University. The first thought which came to me was that it was here that Charles Anthon was professor of Greek and Latin, - he that published the series of annotated editions of the ancient Classics. When I began to read Homer's "Iliad" at high school the text I used was a thick volume bound in sheepskin, prepared by Charles Anthon and containing an abundance of helpful notes. But he had long passed away. He was born in New York City in 1797, graduated at Columbia in 1815 and died in 1867.

Several American universities had been developing great graduate schools, but Columbia, although an old foundation, did not seem to attract outside students to pursue advanced courses. However, as long ago as 1880 it had organized a graduate school in Political Science, and one of my student friends from Toronto was registered in that School. This was James A. McLean of '92, an honour man in Classics and in Political Science. He had been awarded a scholarship in the latter subject and was taking lectures from distinguished scholars on the staff of Columbia. McLean piloted me about the place and I went with him into some lectures. While we were in one room there passed through an elderly man who, I was informed was Ogden N. Rood, the professor of physics. I was pleased to see him, even if only at a distance. He was the best known to me of all on the staff. I had read various papers by him and also his volume in the International Scientific Series entitled "Color" (sometimes "Modern Chromatics"). It was a very superior treatise.

McLean became president of the University of Idaho, and from 1913 to 1934 was president of the University of Manitoba. He died Jan. 18, 1945.

Of course the trouble with Columbia at this time was that the giant had outgrown its garments. Since 1857 it had been located on Madison Avenue, between 49th and 50th streets. During this interval the city had grown enormously, and, further, the requirements of higher education had changed completely. Fortunately the property belonging to the University had not diminished in value. At the very time I was there the institution was being re-organized; and in 1897 the old buildings were abandoned for new ones on Morningside Heights, between Broadway and Amsterdam avenues, from 114th to 120th street. In this new location Columbia University has



continued to expand rapidly and in its own all-embracing way.

I had one more place to visit, namely, Baltimore, some 190 miles farther south. The Johns Hopkins University had opened its doors in the autumn of 1876, and its distinguishing feature was advanced instruction and the encouragement of research. Its comparatively small number of professors were outstanding scholars, carefully gathered wherever they could be found and prevailed upon to come to the new institution.

A special feature was the offer of twenty annual fellowships of \$500 each, open to graduates of any college. The honour courses in the University of Toronto had a high reputation and a considerable number of our graduates had been successful in obtaining these fellowships.

As usual, a friend from Toronto was in attendance at Johns Hopkins. He was Alfred William Stratton, whose home was at 464 Euclid Avenue, Toronto. He graduated in 1887 with first class honours in Classics. He had been awarded a scholarship in Johns Hopkins and was there pursuing graduated studies in Sanskrit. He found me a lodging place and in the evening took me about town. I remember we went to the end of the cable-car line and noted the mechanism for driving the cars. I also observed in Baltimore the prevalence of red brick houses, much as in Toronto. Stratton became professor of Sanskrit and Registrar of the Punjab University, Lahore, India; but he died in August 1902.

I should like to add that at this very time A.P. Saunders, already mentioned, was in attendance at Johns Hopkins, that his brother Charles E. preceded him and his brother Frederick A. followed him, their B.A. degrees being obtained at Toronto in '88, '90 and '95 and Ph.D. degrees at Hopkins in '91, '94 and '99, respectively - quite a record!

Next morning I had an interview with Daniel Cirt Gilman, president of the University. He was very cordial and expressed the hope that I might become a graduate student. Indeed he said they had been accused of favouring graduates from Toronto. I also met Louis Duncan, a professor of electricity, who was specially interested on the engineering side. He was a member of a firm of electrical engineers in New York and travelled often between New York and Baltimore. I thought I might



be taking work under him, and he recommended certain works for me to read, one being "Lecons sur l'Electricite" by Eric Gerard, a Belgian scientist, in two volumes (3rd ed., Paris 1893). These I found modern and fairly easy reading. Prof. Henry Augustus Rowland, the famous head of the Department of Physics, was not there at the time. I was sorry I could not meet him. His very important investigations into the mechanical equivalent of heat, and his invention of the concave grating, which he utilized in a brilliant manner in his researches on the sun, had given him a world-wide reputation.

I left for home with the intention of spending a year at Johns Hopkins.

#### Getting Leave of Absence

The next problem was to get leave of absence to study abroad. This I could not secure in 1893-94; it was too soon after my appointment. At any rate I wished to read some advanced mathematical subjects and also to improve my knowledge of French and German. In 1894 I married and set up housekeeping; naturally further delay.

Two of my intimate friends were somewhat similarly situated as to graduate work. These were Alexander C. McKay of '85, then professor in McMaster University, and G.F. Hull of '92, then Fellow at the U. of T.; both very capable men. The University of Chicago had just been founded, chiefly as a graduate institution, and many distinguished men had been secured for its faculty. It was under Baptist auspices - or at least influences - and my friends were both high-class representatives of that denomination.

In the spring of 1894 the former spent some time in Chicago reading advanced mathematics; then, for a change, he and his wife visited England, spending weeks in London, Oxford, Cambridge, Edinburgh, and he was highly pleased with this experience. The result was, he and his family spent the college year 1896-97 at Cambridge. As to Hull, he spent the second quarter (i.e., April, May & June) of 1895 at Chicago, was favourably impressed, and at the end of September went back to enter on the fourth quarter; and he continued until he obtained the Ph.D. degree in 1897, - one of the earliest to receive it at the University of Chicago. At that very time (the week of October 20) the Yerkes Observatory was dedicated.



During the session 1895-96 my colleague W.J. Loudon was very ill and I was glad to relieve him of his lectures. This overplus of work for me continued, and President Loudon, who was also professor of physics, told me on July 14, 1896, that I could not be spared in 1896-97. Then in 1898 I spent the spring in Germany and the summer in Britain. Thus the years passed.

Something else happened. For the session 1897-98 Edward Charles Jeffrey of the Class of '88, who was Lecturer in Biology and was an able botanist, obtained leave of absence and spent the year at Harvard, and at its close was given the Ph.D. degree. In 1902 he was called to Harvard to be Professor of Botany.

This was very interesting to me. I determined not to postpone the matter any longer. I asked the President if I could obtain leave of absence for 1900-01, and in order to forestall any reasonable objection I offered to provide a substitute. He agreed to that proposal.

On March 5, 1900, I handed the President my formal application for leave of absence for the next year.

On March 8 I wrote to Professor Trowbridge, the head of the Department of Physics at Harvard, and enclosed a statement signed by President Loudon. I asked to enter the Graduate School, with permission to present myself as a candidate for the Ph.D. degree at the end of a year, provided that the year's work was satisfactory and sufficient. I asked also for a fellowship or scholarship to help pay my expenses, as I had no independent means of support.

In a very few days there came a letter stating that my communication was a little late but that it would be held as an application until a formal one on a prescribed blank, which was enclosed, should be received. Without delay I filled it out and returned it on March 16. On the 19th I wrote a letter to Prof. B.O. Peirce, who was chairman of the Mathematics and Physics Division that year, and who as such had written to me a few days before. On March 22 came an official letter stating that my application for a Fellowship or a Scholarship had been received and would be reported on early in May. But actually on April 27 I received notification that I had been chosen for an Austin scholarship of value \$250. I was highly pleased.



It would pay my fees of \$150 and leave \$100 for other expenses. Next day I wrote to Trowbridge and Peirce expressing my appreciation of the generous treatment I had received.

#### Summer Cottage - without a Home

The next thing now was to adjust my family affairs so as to be free to go to Cambridge in the autumn. I had arranged to build a summer cottage during the summer of 1900. A few men connected with the U. of T. had formed a company called The Madawaska Club and had acquired an extensive area of land at Go Home Bay, and a summer settlement was being established there. In the month of July 1899 I spent two weeks at this place. I chose a site and made a bargain with the caretaker of the Club to build a cottage on it. After I went home I drew the floor plan to scale; and I expected the place to be ready for occupation the following June 1900.

Early in May 1900 I learned that nothing had been done towards my building; so in company with W.J. Loudon, the "big push" in the enterprise, I left for Go Home on May 31. I stayed there for two weeks, at the end of which time the house was almost completed. (My experiences at Go Home Bay during 1899 and 1900 have been printed in the semi-centennial volume, "The Madawaska Club, Go Home Bay, 1898-1948".)

We were in for many changes during the next few months. We packed up our furniture, shipped part of it to Go Home Bay and stored the rest. Five days later, on Wednesday, June 27, my family went to Go Home; but the furniture had not arrived, and a terrific gale prevented it from being delivered for three more days. However the ship arrived bright and early on Sunday morning, and with lots of friendly assistance we got settled in our new house on that beautiful Dominion Day. We had a healthful and delightful summer until September 11 when we made our next move back to Toronto. We now had no home to go to, but kind relatives took us in; and in the next two weeks we completed arrangements for the family to spend the following year in Cambridge, Mass.

On the afternoon of September 25 I left Toronto by S.S. Chicora on my way to Boston. At Buffalo I had to wait two hours, and then I took a sleeper for Boston which was reached at 12 noon next day. A fellow-passenger was Donald McFayden, a Classics man of '96, who had received a \$200 scholarship and was to be a student



of history in the Graduate School at Harvard. McFayden obtained the A.M. degree in 1901, was later an episcopal minister at Amherst, Mass., and also a professor at Denver, Col.

We came out to Cambridge and I went to 14 Sumner St., to which place Professor Cohoe had given me a letter. Next day I registered at the University Office, and then interviewed John Trowbridge, Edwin H. Hall and Wallace C. Sabine, the three members of the staff in Physics with which I expected to have most to do. They were all very agreeable. After this I began to search for an apartment for my family to occupy, and, as I had been warned, I was not able to find a suitable furnished one. So on Saturday, September 29, I agreed to take the ground floor of three flats at 239 Upland Road, and rented it for nine months at \$18 a month. The house was comparatively new and conveniently located. My landlady, Mrs. Macnamara, with her young family, lived in the top flat. She and her husband were very agreeable to us and we have exchanged greetings at Christmans ever since.

I had come to Cambridge for one single object, - to spend a year in graduate study and research. The ordinary period spent by a graduate student was one year for the A.M. degree, three for PH.D. I was anxious to make the best use of the time I had before me.

In discussion of my work for the session with Professor Trowbridge it was agreed that I should take one graduate course of lectures in mathematics, namely, "Mathematics 10" and one in physics, namely, "Physics 8" and a research course in experimental physics, namely, "Physics 20a".

Mathematics 10 was the well-known course on "Fourier's Series and Spherical Harmonics" by William E. Byerly. It was given in Sever Hall on Tuesdays, Thursdays and Saturdays at 12 noon, and there was no delay in beginning it. The first lecture was on Saturday, September 29. Byerly was an excellent teacher. He had offered this course for a number of years and had published a fine volume on the subject, which we used as a text-book. I enjoyed it very much. A professional mathematician would pronounce the course easy and comparatively elementary, but the physicist found it hard enough, and it had very useful applications to problems in physics. There were about fifteen in the class.



On the afternoon of that first Saturday I walked out to Craigie House, where Longfellow lived from 1837 until his death in 1882; and to Elmwood, where James Russell Lowell was born in 1819 and died in 1891. Two fine old colonial mansions; two distinguished occupants!

In attendance this session at Harvard was W.G. Hornell, professor of physics at Ohio Wesleyan University, Delaware, Ohio. A few years before this he had spent a year in the Graduate School and had obtained the A.M. degree; having now another year's leave of absence, he had returned to carry on experimental work in the Jefferson Laboratory. He and his wife had been married six years but they had no children. They had rooms at 45 Trowbridge Street. They were admirable people and we soon became close friends.

At 10 a.m. on Monday, October 1, Hornell and I met Trowbridge to arrange for the course Physics 8 which we were to take with him. The subject was "Periodic Currents" and it consisted largely in reading together Steinmetz's "Alternating Current Phenomena", with references to Drude's "Physik des Aethers". We sat near together around a table and had personal discussion. My two courses of lectures were very different. Byerly's was clear-cut and definite. He went very deliberately over the first chapter in his book, walking back and forth in front of the blackboard as he expounded the various terms and ideas involved. Having carefully laid the foundation, he proceeded to build upon it as we met him three times a week. The course with Trowbridge was almost "go as you please". We found Steinmetz and Drude difficult enough and Trowbridge did not attempt to prepare any portion of the work in order to present it to us. I suppose he thought that what one really appreciates is always secured through one's own efforts. He had many other things to attend to, and we enjoyed the personal association with him.

I should have enjoyed courses of lectures with Professors Hall and Sabine as they were superior men. The former, when a graduate student at Johns Hopkins discovered in 1879 the Hall Effect, and he had had a distinguished career afterwards. He was appointed to the Harvard staff in 1881. The latter had just completed an investigation which brought him fame. On the University grounds the Fogg Museum had recently been built, and its auditorium had been found to be very faulty from



the acoustical point of view. The President asked the Physics Department to find out what was the matter and how to remove the fault. The task was assigned to Sabine, who, after three years of experimenting, specified what was wrong and how to correct it. This investigation put the subject of architectural acoustics on a definite scientific foundation. Prof. B. O. Peirce was on leave of absence for the session and I did not meet him. However I had enough to keep me busy.

On the afternoon of October 2 I took my filled-in form to the Library and received a ticket admitting me to the stack rooms. I was allowed to bring away three books, which I could retain for a month. On this visit I chose two, one of which was Righi's "Optik der elektrischen Schwingungen", the German edition of the original Italian volume from which I received the suggestion for my research. At our lecture next day I discussed with Trowbridge the experimental course Physics 20a. I explained that I had given considerable attention to Hertzian waves and wireless telegraphy, in the development of which Righi's oscillator had quite a prominent part. In Righi's book he stated that if the two metal spheres used were of solid metal the oscillator was much more efficient as a radiator than if they were thin shells. I told him that in Toronto I had done much experimenting on the problem of finding just how the efficiency diminished as the shell was made thinner. He told me to go ahead and see what was in it.

Professor Trowbridge showed his great storage battery consisting of 20,000 small cells which had been constructed in the Laboratory workshop in order to carry out some of his investigations. It had been expensive to build and cost a good deal to keep in order. He said he had been criticised for building it but he was highly pleased with its performance. He thought I might possibly utilize it in my work. He expressed a willingness to supply anything I needed and said the mechanic and carpenter and also the helpers around the Laboratory were at my service.

The Byerly course proceeded at its steady pace until December 13, 1900, when the mid-year recess began. Early in the next year was the Mid-year Examination. The paper contained 14 long problems and we could take some weeks to answer them. We were permitted to consult books and printed matter generally, but we must not ask any person for hints or for solutions. I had never had such a test before, but in



the time allowed I was able to obtain practically complete solutions for all the problems. The course by Byerly was largely based on Riemann's "Partielle Differentialgleichungen" and of that book I had a copy. It helped me in answering the examination paper. The lectures resumed on March 26 and continued until May 2. The final examination was on June 11 and the examination paper contained 9 problems, but this time we had to get solutions in a few hours. I was well pleased with the whole course. As stated in the preface to Byerly's book, it was intended to be "a partial introduction to modern Mathematical Physics". In the fifty years since then some new mathematical methods have been devised for handling problems arising from new fundamental discoveries in physics, but the treatment outlined by Byerly in his book is still useful and important.

The course Physics 8 also continued through the session and I was pleased to get on friendly terms with Professor Trowbridge. He arranged for several seminars which all the graduate students in the Laboratory were expected to attend. At one of these I led a discussion on unipolar induction. First I gave a synopsis of a paper in the "Annalen der Physik" which Trowbridge had placed in my hands, and then all took part in considering the results which I reported.

Ueber unipolare Induction und den Pohl'schen

Versuch von Ernst Lecher, Wied. Ann. 4F, Bd. 3, p.513.

My experimental research gave me much anxiety and labour. When I was experimenting with electric waves in 1895 the "oscillator" which I generally used consisted of a metal sphere with a small knob at each end of a diameter, and when these were joined to an induction coil an electrical charge was given to the sphere. When a spark passed between knobs and sphere the charge rushed back and forth on the sphere and in doing so produced electric waves in the surrounding 'ether' which spread outwards in all directions; just as, when a bell is struck, sound waves are produced in the surrounding air and move out radially from the bell.

Now Righi, whom I have already mentioned, devised an oscillator comprising two spheres near together, with the two knobs at the 'ends' of the pair. In this case the electric charge oscillated back and forth from one sphere to the other. Young Marconi, as I have remarked, was a pupil of Righi's and began his experiments in wireless telegraphy with him. Righi stated definitely that an oscillator of this type was more efficient as a radiator of electric waves if the spheres were of solid metal than if



they were thin shells.

We speak of an electric current passing through a conductor, say a straight wire, and compare it to water flowing through a pipe. If the current is direct it flows continually in the same direction. An alternating current continually changes its direction of flow - forwards and backwards - in the conductor, and if the frequency is low, say 10 cycles a second, the flow takes place through every part of the cross-section of the conductor, but if the alternations are a hundred million cycles a second things are entirely different. As the electricity rushes back and forth it utilizes only the outer 'skin' of the conductor; the core of the wire might as well not be there, or the wire might be replaced by a tube of the same diameter. I suspected this 'skin' effect was present in these oscillators, in which the alternations were millions per second.

I worked with oscillators of two types: (a) comprising two equal spheres, (b) two equal cylinders.

The spheres were of three sizes, having diameters 1 in.,  $1\frac{1}{2}$  in. and 4 in. There was a pair of solid brass spheres of each size, carefully turned and polished; and, matching these, a pair made from lignum-vitae wood, turned with equal care and covered with gold leaf which was stated to be  $1/220,000$  in. thick. An oscillator composed of solid metal spheres seemed no more efficient than that of the same size composed of the excessively thin shell.

The cylinders were all of the same size, namely, 1 inch in diameter and 5 inches long including the hemispherical ends. They were constructed from various metals and from other substances, some being solid, others being extremely thin shells. As for efficiency, the shells could not be distinguished from the solid bodies.

I cannot describe the method used in comparing the different types of oscillators but the tests were made with the utmost care and in the greatest detail. Thus the result was negative, there was no difference. I was sorry that it turned out so, but there was no doubt about it.

Somewhere about May 1 I collected all my results of observation and prepared a full account of my investigation. In the course of my experimenting I discovered a new method for measuring wave-lengths of the electric waves. This I embodied in my



Thesis, so that its title was, "An experimental investigation into the 'skin' - effect in electric oscillators; with a method of determining wave-lengths". I prepared it with great care and illustrated it with accurately drawn diagrams and photographs. It occupied 36 pages of typewriting and 22 pages of illustrations.

#### Thesis and Oral Examination

In due time I was informed that my Thesis had been accepted, and thus a big burden was lifted from my mind.

The oral examination was some weeks later. The professors in physics and several others were present, to learn about the problem I had tried to solve, and also to quiz me regarding my general knowledge of physics. Regarding the latter, I got along fairly well, as might be expected, since I had been teaching physics in the university for nearly ten years. But the fact that I was under mental strain was shown when Professor Hall asked me what evidence there was for the existence of molecules. Now I was always interested in this fundamental subject, and when I was in Ottawa in 1891 I prepared a paper on "The molecular structure of matter" for the M.&P. Society at the U. of T. Most of the facts in it were obtained from a paper by William Thomson (Lord Kelvin) which was printed in Nature (March 1870) and was reprinted as Appendix F to Thomson and Tait's famous "Treatise on Natural Philosophy" (2nd vol., 1883). I had read it with care and thought I had mastered his arguments; and yet when questioned in 1901 my mind was almost a blank with respect to them. I stated just where the information was to be found but I could not recall the facts. I was passed by my inquisitors.

When I received from the Registrar the Official Report on my work during the session, opposite each of the three courses, Math. 10, Phys. 8, and Phys. 20a, there was the letter A.

#### Housekeeping at Cambridge

Having rented an apartment I was anxious to be in it with my family. My landlord promised that it would be cleaned, ready for occupation by October 11 (Thursday).

So on October 12 I went to an auction room on Massachusetts Avenue and bought a brass bedstead with spring-bed and hair-mattress; also a rocking chair. The bed was rather finer than might be expected among the furnishings of an apartment rented for a few months, but it pleased me and I thought it would last a life-time. I did not think that styles change and even metal beds wear out. However it served us many years.



The over-useful Harvard Co-op. gave me a list of merchants who promised a generous reduction to Harvard students. From one well-known firm I got a set of dinner dishes and some kitchen furniture, and "5 and 10" supplied many kitchen gadgets. From a firm on Canal street I got quite a load of furniture, including an extension table and chairs; another company supplied two folding cot beds. I planned to ship much of this furniture to our new summer cottage at Go Home Bay. At any rate the total cost was very modest.

### Pleasing Social Occasions

In the interval between my arrival and the coming of my family I was able to "take in" some features of Cambridge and Boston. Not far from where I was staying were three other students from Canada, - McFayden, already mentioned; Grant, a student in Geology, from B.C.; and Moore, whose home I do not recall.

On October 4 McFayden and I attended a reception for graduate students. On Saturday, Oct. 6, Grant and I walked to Boston by way of Harvard Bridge, and other busy streets. We discovered a good second-hand book store where I bought a number of books on arctic exploration and also Wemyss Reid's two-volume life of Richard Moncton Milnes. I chose the latter simply because Milnes (Lord Houghton) was the author of a little poem with the title "Good-night and good morning" in the old second reader, which began:

"A fair little girl sat under a tree,  
Sewing as long as her eyes could see;  
Then folded her work and smoothed it right,  
And said, "Dear work, good night! good night!"

With the load we had to carry we went home by street-car. It is interesting to learn that 50 years later (in 1950) a new "life" of Milnes is being published.

Next day (Sunday) we four went to Appleton Chapel in the evening and heard a brilliant lecture on the nature of Christianity by Samuel Eliot.

The following Saturday the same quartette journeyed to Boston to see "Hamlet" at Hollis Street Theatre. All seats had been sold and Grant and Moore went to Tremont Street Theatre. McFayden and I, however, walked along Boston Common and Beacon Street, which we had never seen before, and then went home.

Next day, my third Sunday, was a drizzling, misty day. About 3 p.m. McFayden and I went down to Quincy Hall and called on Dr. W.A. Neilson, who had been a teacher in Upper Canada College, Toronto, in 1891-95, and was now an instructor in English



in Harvard. Before we had left, other instructors came in to join in the ceremony.

McFayden and I went to evening meal together and after that to Appleton Chapel where we heard an eloquent sermon on "Peace" (John, Ch. XIV).

There were always noted preachers in Appleton Chapel. Also one could attend varied entertainments during the week. Perhaps the most interesting person I listened to was Edward Everett Hale. At this time he was 79 but he was active and the young men heard him eagerly. Hale was made chaplain of the United States Senate in 1903 and he died six years later.

At the M.I.T., which was still located on Boylston Street in Boston, there was a Physical Society and to its meetings graduate students in Harvard were invited, as they were also to some lectures provided by the Lowell Institute. Three of these meetings I clearly remember. Two of them were by Elihue Thomson who described some of his researches in electricity. He was an excellent lecturer and had many neat original experiments. The third lecture was by Michael I. Pupin (1858-1935), a professor at Columbia, who explained his method of "loading" telephone lines with inductance coils in order to improve long-distance telephoning. He had just sold his patent rights to the Bell Telephone Co.

#### Family Experiences

My beloved wife and the two little girls arrived on October 18. She reported a long and tiring journey from Toronto, but Walter E.H. Massey, who was on the same train, was helpful when the younger child was restless. We knew Mr. Massey through his activity at Central Methodist Church, where he was leader of the Bible League which was attended by many young men. On Sunday, July 26, 1896, I had acted as a substitute for him. He died not very long after this trip to Boston. Mr. George M. Leo, a well-known officer of the Church, on behalf of Mrs. Massey, asked if I would undertake the leadership of the League, stating that she would be glad to continue to entertain its members at her home on Jarvis Street and at the summer camp at Sparrow Lake. I feared I should not be a success in that position and had to decline.

We were happy to be together again. The apartment was not well furnished but it was comfortable. There were two bedrooms, a living and a dining room, a bath-room and a good kitchen. We proceeded to enjoy our months in Cambridge. The wife always has the burden of the household to bear. In this case there was a feeling of anxiety from



another quarter, - another addition to the family was expected before the end of the session in the spring. But we did not let that cloud darken our sky unduly. We soon had a number of friends and were able to secure a helpful Irish maid, so that we were free to attend various meetings and entertainments, - including a concert in the new Boston Symphony Hall, in the construction of which Professor Sabine's discoveries in architectural acoustics were amply verified. There was also a Harvard Dames' Club in which kindred spirits met. Our days were filled with duties and the weeks passed quickly by.

I was surprised at the ignorance regarding Canada exhibited by some of our neighbours and my fellow-students. They were surprised that we did not speak French. Of course many French Canadians had settled in the Norht-eastern States and the knowledge of geography possessed by my friends was not extensive. A lad in our apartment house asked if the people of Toronto did not speak French. Now with my little 5-year old I had explored the country round about, and within a mile of our home, in the direction of Fresh Pond, I had discovered a French Canadian Settlement, - and how persistent such settlements are! I was able to tell mu friends that within one mile of our house on Upland Road I could hear more French conversation than I would hear in Toronto in a year.

On Wednesday, Jan. 22, 1901, our revered sovereign Queen Victoria died, and the next Sunday morning my wife and I attended the service in Christ Church (built 1760) on Garden Street, near the Harvard Yard, and heard some very appreciative remarks on the deceased Queen. This pleased us greatly. As far back as I could remember Queen Victoria was on the throne. She seemed a permanent institution and the whole Empire seemed solid and unchangeable. The wars which had occurred in my lifetime seemed incidental. Even the recent Boer war was so far away that we did not think of it as endangering the equilibrium of the civilized world. One of the simplest incidents which seemed to strike me was the substitution of K.C. for Q.C. in our law courts. It required a long time to become accustomed to the change.

In early spring there seemed to be much overcast sky and moist weather, and the gravel walks on many streets of Cambridge suggested a 'big village', which, as a matter of fact, pleased us greatly. When the sunny days of May approached we thought our



older child, whose sixth birthday was early in that month, might attend the public school. So I went to call on the Superintendent of Schools, at the City Hall. He was very agreeable. I said I had heard a great deal about the schools in Boston and he remarked that he thought those in Cambridge rather superior. At any rate I got the necessary books and other material, and daughter started at Peabody school which was not far from our apartment. She enjoyed the experience, and not many days elapsed before we heard her singing "The Star-Spangled Banner". Fifteen years later the same person lived in Cambridge while she pursued a session's study at the Boston Museum of Fine Arts, after she had obtained her Diploma at the Ontario College of Art in Toronto.

Our third child was born on the evening of May 3, 1901, at our apartment, there being in attendance a local physician who had been recommended to me by friends on the Medical Faculty at Toronto, of which I was a member. Under a competent nurse the mother and child made a good recovery. We named him James Trowbridge, after James Clerk Maxwell and John Trowbridge, two men to whom I owed much.

Commencement was on Wednesday, June 26, on which occasion 29 Ph. D. degrees were granted, three being in Physics. In our procession that day marched Theodore Roosevelt. He had been elected Vice-President of the United States the previous November, along with McKinley for President; and when the latter was assassinated on September 5, 1901, stepped into his place.

It is appropriate that I should here refer to two other occasions when I was a Harvard University.

During World War I the University of Toronto closed its sessions early in order to permit students to train for the war. I was beyond military age and in the spring of 1916 I inquired of Edward C. Pickering, director of the Harvard Observatory, if it would be convenient for me to devote there six weeks or two months to a research in astronomy. I was cordially invited to come. There I was given some 500 8X10 photographic plates of a portion of the sky which included the constellation Virgo. Among the stars on every plate was a special one which was known to vary in brightness and the task before me was to determine just how its brightness rose and fell with the passing of the days. I was also instructed in the method of comparing the "magnitudes" of the stars on the plates. The work was very interesting and the company very agreeable. During my visit I was able to make a full investigation into the light-curve of the variable star designa-



ted W Virginis. Some years later I had a surprised feeling of pride when a speaker at the American Astronomical Society referred to "Virginis as Dr. Chant's star.

In 1936 the Tercentenary of the Founding of Harvard College was celebrated with appropriate ceremonies, and I was privileged to be present. At this time I was the recipient of a silver medal which had been struck for the occasion.

. . . . .

My special work was done, but before leaving this part of the country I took photographs of some of the places I was especially interested in. On my bicycle I went to Walden Pond and took a negative of it, and I also cut an oak "shoot" for a walking stick. Then I went on to Concord where I got pictures of dwellings occupied by Emerson, Alcott and Hawthorne. On another day Hornell and I rode to North Woburn where I photographed the birthplace of Benjamin Thompson, Count Rumford, with its old well-sweep; also, within the house, his cradle and brass-studded trunk. I was much interested in Rumford's extraordinary career - political, social, scientific - in America and Europe. Also I obtained a negative of the nearby mansion of Colonel Baldwin whose name was given to the Baldwin apple.

On Friday, June 28, we left for home. I had packed up our house furnishings as best I could and was surprised that there was more than enough to fill a small truck - in all, about a ton! They were taken to the neighbouring station and shipped by freight. Our family luggage was sent to the South Station in Boston in the morning, and Irish Nora accompanied us in the afternoon to take the train. In order to make the journey easier, I had engaged the drawing-room of the Pullman car. The weather was very warm and we dressed to be comfortable. The windows were opened wide and the swirling sand permeated everything. There were no air-conditioned cars at that time. We reached Toronto at 3 o'clock next morning and our friends were at the Union Station to greet us - and to carry the baby!

(April 5, 1950)







### XIII. Astronomy at the U. of T.: a Trip to Eastern Observatories.

#### The Astronomical Society

Upon returning to the University in the autumn of 1891<sup>1891</sup> I was interested in The Astronomical and Physical Society of Toronto, which had been incorporated the year before. The proceedings of its meetings were prepared in such a way that the newspapers readily printed them, even though rather long sometimes. I noted that the chief emphasis in the Society was on Astronomy and I supposed its name had been chosen in order to assure an open door to students of Physics also. However, as everybody knew, the expansion of astronomy during several decades had been towards physics and somewhat away from mathematics. This has been described as an attempt to put physical flesh on the mathematical bones which form the frame-work of the science. But it was evident that Astronomy was the Society's main interest.

I attended some of the meetings. At first they were held in the houses of the members. This gave them a sort of friendly 'cottage' atmosphere. I was elected a member on December 13, 1892, at a meeting held at the residence of John A. Paterson, a well-known lawyer, at 23 Walmer Road. Mr. Paterson graduated B.A. at the U. of T. in 1866, with the silver medal in mathematics, and he was president of the Society in 1896 and 1897. But this peripatetic state of affairs could not continue; a fixed meeting-place had to be found, and the first one was at the Y.W.C.G., 19 McGill Street. The first meeting there was on August 22, 1893.

Up to this time my knowledge of astronomy was pretty meagre. I had read what was described in the school text-book as "mathematical geography". But the teaching of geography in the high school I attended was very ineffective. Actually it was while I was teaching public school that I got my first "touch" of astronomy. In Sullivan's "Geography Generalized", a copy of which my eldest brother used as a text-book in 1870, there was an Introduction to Astronomy. It was largely a description of the solar system written in a simple manner and put so that I could memorize the facts. What I heard here in the Society's meetings was of a different nature. There was a lively interest in making actual observations of the sky.

The Society continued to grow and I attended its meeting pretty regularly. In May 1900 its name was changed to "The Toronto Astronomical Society". The alteration was



made "for reasons of expediency, but chiefly in order that it may possess the shortest corporate name capable of indicating its objects".

It will be noted that the word "Physical" was eliminated. But the new title was used for only two years. Someone with a broader outlook and more ambitious plans suggested the name, "The Astronomical Society of Canada", which was acceptable to the members. Before proceeding farther, however, a request was made to the Governor General for permission to prefix the word "Royal" to the name. This he forwarded to England and the King expressed his approval.

So on March 3, 1903, by an order from the High Court of Justice of Ontario, the society's name became, "The Royal Astronomical Society of Canada".

The Society at first published an annual volume and up to 1900 the name of the editor does not appear on it. The volumes covering the years 1901, 1902, 1903 were prepared by Arthur Harvey, who was president during 1898 and 1899. The volumes for 1904 and 1905 were prepared by myself. There was no separate volume for 1906. It would naturally have been ready early in 1907, but instead of it the Journal of the R.A.S.C. was started and I have been editing it ever since. In the issue for September 1940 there was printed a 40-page history of the first fifty years of the Society.

I was president of the Society for four years, 1904-07, although the usual tenure of that office was two years.

#### Astronomy at the U. of T.

As the years passed I realized how little the University was doing for astronomy. At this time two courses in it were given, both in the Department of Mathematics. One was an elementary course taken by pass students in Arts and by students in the School of Science; the other, a course in Spherical Astronomy for students in Honour Mathematics. In these courses only the mathematical side of the subject was treated, although the applications of physics to astronomy had revolutionized the work at the modern observatories.

I was anxious to improve this condition of things, and thought the best way to begin was to combine Astronomy and Physics in a new graduating course. For about twenty years students in the M. & P. course had been able to choose in their Fourth Year either



pure Mathematics , or Physics. I suggested a third option. This I discussed with my fellow-members on the staffs in Mathematics and in Physics, and all were agreeable. So a statute was passed by the University Senate late in 1904 establishing the new course. In order to inform the students regarding this matter I prepared an article for The Varsity explaining the new course. It bore my signature as author, but it was adopted as an editorial in the issue for February 16, 1905. I quote the first two paragraphs:

"Though the subject of Astronomy has never been entirely ignored in the University, it has never received the attention it deserved. It seems probable, however, that this condition of affairs will soon be remedied, as at a recent meeting of the Senate a statute was passed creating a graduating course in Astronomy and Physics.

Heretofore students in Mathematics and Physics could choose in their fourth year either pure Mathematics or Physics, but under the new statute a third option is offered, namely, Astronomy and Physics. The work will consist of the following subjects:- Elementary Astronomy; Advanced Theoretical Astronomy; Practical Astronomy; Celestial Mechanics; Differential Equations; Theory of Least Squares; and Physical Optics (including Spectrum Analysis)".

I was anxious to secure co-operation between the University and the Astronomical Society. I proposed that the University provide a room for the meetings of the Society and a smaller one for its Library and office, and in return receive the use of the library and of the instruments in the Society's possession. As I have remarked, my term as President was extended to four years, and the reason was to enable me to arrange some scheme of working together which would be of advantage to both parties. But with the best of good wishes on both sides no satisfactory arrangement could be reached. Perhaps it was well that it was so,- that each should work out its own destiny. As I see it now, I was living in a somewhat idealistic world. It seemed to me that the University and the Society were two firmly established bodies proceeding in their regular orbits, and that any arrangement between them might go on for an indefinite time, a century or more, without being disrupted. But since then we have had two world wars and there have been great changes in both bodies. Organizations do not seem so stable now!



Soon after the course in A. & P. was established I suggested to the Council of the Royal Astronomical Society that the Society might perhaps provide a Gold Medal to be presented to the candidate who stands first in First Class honours on graduation in the new course. This was approved. The first award was made at Commencement in June 1906, on which occasion I had the pleasure of presenting the medal to William Edmund Harper, and at the same time of informing him that a telegram just received from the Chief Astronomer at Ottawa stated that he had been appointed to the staff of the Dominion Observatory which had been established the preceding year. Mr. Harper later became director of the Dominion Astrophysical Observatory at Victoria, B.C., where he died June 4, 1940. His ability and unremitting industry contributed largely to the high standing of Canada in the astronomical world.

Ever since the course in Astronomy and Physics was established there has been a steady stream of trained astronomers going forth year after year. Usually they have been employed in astronomical work, although some have entered the teaching profession. At one time, perhaps twenty years after the course was instituted, it was a great pleasure to me to note that practically all the astronomers in Canada, chiefly in Observatories and in Government services, had been my personal students.

#### Trip to Observatories in Eastern States

I was much concerned now to obtain instruments and apparatus to be used in the teaching of astronomy. In the School of Practical Science there were levels and theodolites and other equipment for instruction in surveying; what I wanted was chiefly for students in the Faculty of Arts. The fundamental ideas of time and of position on the earth and in the sky were of course the same in arts and engineering. I thought to make my practical teaching more of the laboratory type and that I might get some useful information by visiting some of the observatories in the United States. Further, there was to be a total eclipse of the sun visible in eastern Canada in August 1905 which I hoped to observe, and I desired to get some suggestions regarding it.

On May 3, 1905, I left Toronto at 9.45 a.m. by C.P.R., and at Buffalo, at 1.00 p.m. took the Empire State Express. I arrived at Syracuse at 3.45 and was met by Fred A. Saunders of '95. He was professor of physics at Syracuse University, a reputable



institution under the control of the Methodist Church. We went through the Physics Building which was erected in 1898 when Eugene Haanel was there. For a number of years Haanel was at Victoria University when it was located at Cobourg. He was a notable member of the Faculty and when I was a lad I used to hear stories of his courses in physics and in mineralogy. He was a thorough German, a Ph.D. of Breslau University. Arthur P. Coleman, who achieved distinction as professor of geology at the University of Toronto and who discovered the great nickel deposits near Sudbury, was one of Haanel's students. When University Federation was consummated Haanel secured a position in Syracuse. Another of Haanel's students was Clifford Sifton; and when he became Minister of the Interior at Ottawa he appointed Haanel Superintendent of Mines. In 1904 there was published by the Department of the Interior an elaborate treatise "On the Location and Examination of Magnetic Ore Deposits by Magnetometric Measurements" which Haanel had read at the Annual Meeting of the Canadian Mining Institute on March 5, 1903. My copy has attached to it a transmission note signed by Dr. Haanel dated July 16, 1904.

We also inspected a small observatory, built of stone, containing a 10-in. telescope, furnished with a spectroscope; but little use was being made of the excellent instrument. I found that many colleges of moderate size in the U.S. had high-class telescopic equipment of about this size and that often the instruments were not in active use. From my own experience I should say that this lack of regular use was because it is difficult to arrange a timetable for practical work with a telescope since its use is dependent on the weather and is chiefly at night; but these modern 10-in. equatorials are capable of important research in the hands of a devoted astronomer. Great discoveries have been made with instruments smaller than these.

It would appear that a 9 or 10-in. telescope in a pleasing little building was a favourite donation to a college in the United States. It was much superior to anything we had in Toronto.

A large building programme was under way. Chancellor Day, the head of the institution, was very efficient in securing support for the University. Continually he moved about the country, his services being much sought after. I had heard him speak on several occasions. Usually such able men were chosen Bishops of the Methodist Church. One of Dr. Day's successors at Syracuse was Bishop Flint of Stouffville, Ont. I was told that the attendance at Syracuse



University then was 1000 and the income \$125,000.

I said good-bye to Dr. & Mrs. Saunders and at 7.45 boarded the train for Schenectady, where George Laidlaw, my brother-in-law, met me at 11.30 p.m.

In the morning I visited once more the ever-wonderful G.E. Works where George was employed; and in the afternoon I went to Albany to call upon Lewis Boss at the Dudley Observatory. This institution was established in 1851 by gifts from citizens of Albany and took its name from the largest donor, Mrs. Blandina Dudley. Its first director was Benjamin Apthorp Gould and its early history contained some interesting episodes. Boss was appointed director in 1876, and a new building on a new site was completed in 1893. Its chief instruments were a 12-in. equatorial by Brahear with mounting by Warner and Swasey, and an aged meridian circle by Pistor and Martins having an 8-in. aperture and graduated circles a metre in diameter. Upon the latter the director's care was lavished. Boss at this time was almost 60 years old, and he had had experience with politicians and newspapers, as well as with the work of determining with the greatest precision, the positions of the stars in the sky. He was now engaged on the preparation of a Fundamental Catalogue of Bright Stars (I and II mag.) for the Carnegie Institution of Washington, which indeed had taken over the Observatory as its Department of Astronomy.

I was delighted to have a long talk with Boss on observatories and equipment. He insisted that an observatory should be in a convenient place. A students' observatory should be near the other university buildings and a research observatory should also be easy of access. He told me that George Ellery Hale who, as everyone knows, was instrumental in obtaining the great 40-in. Yerkes telescope for the University of Chicago, remarked to him that he would be pleased if he could wake up some morning and find the mighty telescope on the lake shore near Chicago and not on Lake Geneva, seventy-five miles away. In all my efforts in later years to secure an observatory and astronomical equipment for the University of Toronto I kept firmly in mind Boss's views as to convenience of location.

As to equipment for students' work he recommended two or three inexpensive transit instruments, including one of the "broken" type. He thought these instruments might be in adjustment so that the students would appreciate the meaning of errors of collimation and level. These were largely exercises in the "old astronomy"; I was anxious to introduce more of the "new astronomy" or astrophysics.



Boss was born at Providence, R. I., Oct. 26, 1846; graduated at Dartmouth in 1870

(on the classical side); and died Oct. 5, 1912.

Next day I went to Amherst to consult David P. Todd. He was well known as a man of originality and ingenuity, - and of having a capable and charming wife. They were "experts" in observing solar eclipses, and Mrs. Todd was the author of a small but creditable volume on the subject. I admired Todd's "New Astronomy" and his "Stars and Telescopes". From the former I obtained useful hints in teaching the subject while the latter contained a great body of information well arranged and well indexed. It is still useful after fifty years!

Professor Todd was just completing the equipment of a new observatory. His main instrument was an 18-in. Clark refractor. It impressed me greatly, and every detail of its mounting had been carefully thought out. The shutters of the dome were wider than usual and were opened and closed by right- and left-hand screws and they came snugly together, angle-iron fitting against felt. His observing chair was to be hung on the revolving dome. He had a 3-in. and a 6-in. transit and a 12-in. photographic equatorial. He had a well 33 feet deep in which he was intending to have a pool of mercury to act as a flat reflector, a Foucault pendulum, and perhaps other apparatus. I never learned just how all his plans worked out. With an added afternoon tea, I had a very pleasant visit.

For our equipment at the University of Toronto, Professor Todd suggested: 3-in. equatorial, 4-in. equatorial mounted with clockwork,  $2\frac{1}{2}$ -in. and 3-in. transit, portable zenith telescope, level trier, barograph and thermograph, 3-in. aperture meridian circle, spectroscope for 6-in. equatorial, camera with colour screens, 2 sextants, 2 chronometers, chronographs and clocks.

At Cambridge, Mass., I discussed the coming eclipse with Director E.C. Pickering. He was professor of physics in the M.I.T. before he was chosen (1876) director of the Harvard College Observatory and naturally much of the research carried on there was of the 'physical' type. At the U. of T. I had devoted much of my time to the subject of light and I was fascinated with the revelations obtained by means of polarized light. I had in mind to investigate further if the light from the chromosphere and the corona of the sun showed evidence of being polarized.

Professor Pickering suggested that I use a polariscope composed of a small telescope with a tinfoil grating at its focal plane, the opaque and open spaces in the grating being



of equal width; after this, a double-image prism placed before the field lens of the eyepiece; and, next to the eye, a nicol prism mounted on a graduated circle which could be rotated. If the light from the eclipsed sun was polarized there would be colour; otherwise, not.

In regard to a students' observatory Prof. Pickering suggested simple apparatus for experiments on (1) Time, (2) Positions of the stars, (3) Magnitudes of the stars and the study of variable stars of long period, and (4) Use of a direct-vision spectroscope in detecting stars of peculiar spectra. All very practical in nature.

I had a long interview with Dr. R.W. Willson, of the University staff, who worked hard to give to the ordinary student in Arts a real understanding of practical astronomy. He used several transit instruments, with micrometer eyepieces, for determining time and latitude, and two of them were far enough apart to determine difference in longitude; also small equatorial telescopes for observation of planets, comets, etc.; and he had arranged exercises in the use of star catalogues; almanacs and other books of reference. Later he published a small book to accompany his course. I was very favourably impressed with the organization of his department.

At Columbia University Dr. S.A. Mitchell had much to tell me. He was born in Kingston, Ont., and was a graduate of Queen's University. Like myself, he entered the domain of Astronomy through the adjoining field of Physics. He gave me a list of books on practical astronomy - Campbell, Doolittle, Loomis, Comstock, Hayford, Byrd and others, with most of which authors I became personally acquainted. Also, he gave me useful information on transits, sextants and other instruments used in their field work in their summer school.

My visit to Charles Augustus Young at Princeton on May 10 was specially pleasing. Young was born in 1834, and from 1866 to 1877 he was professor of Natural Philosophy and Astronomy at Dartmouth. He was the author of a series of books on Astronomy as well as a book on The Sun, with all of which I was well acquainted. It was only twenty years before Young's birth that Fraunhofer published his famous paper on the spectrum of the sun in which he described the dark lines, ever since known as "Fraunhofer" lines; and it was during his active manhood that the significance of these lines was demonstrated by the investigations of Kirchhoff and Bunsen (1859-62). William Huggins, recognized as the founder of astrophysics, published his first paper on the chemical constitution of the stars in 1863. Of course Young



followed these investigations with great interest, and at the Spanish eclipse on Dec. 22, 1870, he was the first person to see the bright-line spectrum of the sun's chromosphere and it was he that named it the "flash spectrum". He was honoured and respected by all who knew him. He died in 1908.

As to the equipment we should have at Toronto, he recommended a transit instrument, two or three sextants, several chronometers and clocks and a chronograph. The desirable details of each of these he specified. He suggested a 4-in. equatorial, which is the largest which is portable, and he was strong on spectroscopes, polarizing solar eyepieces and polarizing photometers. He had many practical suggestions as to building, - to be big enough, of corrugated iron inside and clap-boarding outside; to have flat roofs on which one might walk without injuring them; and so on.

I had a simple lunch with Professor Young. He showed me Joseph Henry's old electrical apparatus with which he made discoveries in electrical induction similar to those made by Faraday and at the same time (about 1830); also, a glass rod with sealing wax on it, which had been used by Franklin in his experiments.

I left Princeton at 6.18 p.m. for Philadelphia, where I was met by my friend William Ezra Lingelbach, B.A. '94 (Tor.), who was professor of German at the University of Pennsylvania, and he took me up to the Hotel Normandie. At the hotel that evening at the end of dinner there was placed before each guest half a grapefruit covered with sugar and embedded in broken ice. That was the first time I saw grapefruit served. I believe the cultivation of this fruit was introduced in Florida and California in 1900. How enormously it has expanded since then!

Next morning I went out to the Flower Observatory at Upper Darby, just west of the city, and visited Charles L. Doolittle and his son Eric. I admired the 18-in. refractor by Brashear and its efficient use in the measurement of double stars by these two astronomers, although the former was interested chiefly in the variation of latitude. I learned that the elder Doolittle and also Lewis Boss were employed on the survey, during the years 1872-3-4, of the boundary between the United States and Canada running west from Lake of the Woods, along the 49th parallel of latitude.



From here I went to Pittsburg to discuss with Brashear the proposed polariscope for the coming eclipse. Of course I admired his large photographic doublets and other marvellous optical apparatus, and we talked over solar eyepieces, and prism and grating spectroscopes which I hoped to order for the U. of T. On departing he gave me ("for the children") a handful of small right-angled prisms, such as used in field-glasses, which he said were "seconds", but which sparkled in the sunshine, and I thought the "a thing of beauty is a joy forever". They were cherished for many years.

Then I went on to Columbus, Ohio, where I called on H.C. Lord, who was in charge of astronomy at the Ohio State University. He had the usual equipment of transits, sextants, zenith telescopes and chronometers for teaching the practical side of the "old astronomy"; but also there was the McMillin Observatory, built in 1895, with its 12-in. equatorial furnished with a 3-prism spectrograph for measuring the radial velocities of the stars. I thought it might be a suitable telescope for the U. of T. Professor Lord had been able to do good astrophysical work with it.

Finally, I went twenty miles north to Delaware, Ohio, the site of the Ohio Wesleyan University, at which the professor of physics was W.G. Hormell, my companion at Harvard in 1900-01. At this excellent institution, at that time, there was an observatory with a  $9\frac{1}{2}$ -in. Brashear refracting telescope, the mounting being by Warner and Swasey. It was presented to the University in 1897 by Hiram Mills Perkins (1833-1924) professor of mathematics there. It was furnished with micrometer and other types of eyepieces, all of high quality, but, as in other places, continuous use was not then being made of the outfit. However in 1923 the observatory was doubled in size and the equipment was enlarged. A year earlier Prof. and Mrs. Perkins donated over \$200,000 to provide the Perkins Observatory especially for astronomical research. After long delay in securing a disc of glass a reflecting telescope with aperture of 68 in. was completed. Some years later an arrangement was made with Ohio State University whereby it should co-operate in research with the great telescope.

When I got home I prepared a report on my trip, although it was taken at my own expense, and presented it to the Bursar of the University. It may be among the documents in his office still.

As the years passed, I had little difficulty in obtaining reasonable appropriations for various pieces of equipment, including a  $4\frac{1}{4}$ -in. Cooke and an 80 mm. Zeiss equatorial,



but there was no suitable site on the University grounds for a small observatory. When University Federation was agreed upon the University's land was pretty completely divided up for specific objects. However when the Physics Building was erected in 1907 the situation was eased. I was allotted one unit on the ground floor for an office and two units on the third floor for an astronomical laboratory. I think I can say that I made good use of this space, as well as of the roof of the building and the University Lawn.







#### XIV. Labrador Eclipse

A total eclipse of the sun was predicted for August 30, 1905. The path of totality was to cross James Bay, continue eastward over the Labrador peninsula, then over the Atlantic Ocean to Spain and the Mediterranean Sea, and end in northern Africa.

When Canada in 1870 took over Rupert's Land and the North West Territories it became necessary to survey these wide lands before they could be thrown open for settlement. This was an enormous task. In doing it it was necessary to fix accurately various points in the area, and to indicate exactly certain meridians and parallels of latitude, so that the boundaries of the townships and lots could be delineated clearly and specified in a simple manner; and to do all this demanded a large amount of astronomical observation, utilizing the "old" astronomy of position, of course.

The instrumental headquarters, the very "heart", of this effort was in certain basements and cellars in Ottawa; and as the great labour approached completion there was a feeling that Canada should inaugurate some regular astronomical work. William Frederick King, gold medallist in mathematics at the U. of T. in 1875, was the Government's Chief Astronomer and in him they had perfect confidence. As a result, the Dominion Observatory at Ottawa came into being. It was ready to begin its work in 1904.

Now an eclipse of the sun is the most spectacular of astronomical phenomena and here was one visible in our own land. The Council of the R.A.S.C. communicated with Dr. King about observing it and he recommended to the Government that it should be done. This met with their approval and Dr. King was asked to organize and conduct an expedition for the purpose.

#### Observing Party

The observing party was made up as follows:

Dr. King, in charge, and J.S. Plaskett, J. Macara, L. Gauthier, W.P. Near, of the Dominion Observatory.

L.B. Stewart, of the Faculty of Applied Science, U. of T.

W. Menzies, of the Toronto Magnetic Observatory.

E.W. and Mrs. Maunder, of Greenwich Observatory.

C. Upton, F.P. Jemings, of the British Astronomical Association.

C.A. Chant, J.R. Collins, A.T. DeLury, D.J. Howell, D.B. Marsh, J.E. Maybee, of the

R. A. S. C.



G.P. Jenkins, of the Hamilton Scientific Association.

Father I.J. Kavanagh, of Loyola College.

Joseph Pope, Under Secretary of State and amateur astronomer.

Fathers J.A. Lajeunesse, H. Simard, of Ottawa University; C.P. Choquette of St. Hyacinthe College.

Conferences were held to reach an understanding as to the work to be undertaken by each, and plans and preparations began at once.

For observing station, North West River in Labrador was chosen, and it was arranged Stewart should go ahead by way of Newfoundland to select a suitable site for the camp. The observers were to assemble in Quebec city on August 1, to be ready to take ship for our destination.

#### Gathering at Quebec

With others from Toronto I reached Quebec on Tuesday, August 1. By telephone we learned that King and Plaskett were at the Chateau Frontenac, and on going thither we were given rooms on the fifth flat, mine being 507. I may say that this was before the big extension upward was added to the hotel. We learned that our ship, the King Edward, was then down the river and that we would not be leaving before Friday afternoon.

Thus we had August 2 and 3 on our hands, an excellent opportunity to explore the ancient city. On one day Plaskett, his young brother, and Anglican clergyman in Quebec, and I went down to see the Montmorency Falls, and although the volume of water passing over them was not so great as formerly we thought them beautiful.

On August 2 Near and Gauthier came from Ottawa. The supplies got ready there for our expedition were extraordinary in variety and quantity. The parcels were all numbered and listed and ran into the hundreds. There were all sorts of tools, hardware supplies, lumber and drugs, as well as provisions.

#### Starting on our unique Journey

The steamer came in on Wednesday evening and began at once to discharge her cargo. We went down next morning to see the King Edward. She was a fine little vessel, 150 ft. long and 22 ft. wide, built at Hull, England, in 1902 by Cook, Welton and Gemmell, No. 307. Her business was trading on the north shore of the St. Lawrence River and Gulf. Upon the



ship we saw boxes of Labrador salmon, three great halibut (one 75 lb.) and several barrels of oil. After clearing out the hold our supplies were put in and on top of them other freight until it was filled to the top of the hatch. In addition barrels of oil, iron pipe and other freight were put on deck.

We expected to leave at 1.30 p.m., Friday, August 4, but it was 7 o'clock before the last freight was put in and the hatch covered over. The ship began to move out at 7 h. 19m. 30s. E.S.T.

To my friend DeLury and me had been assigned stateroom No.10, which was a good one. I was at the first table and my seat was No.1.

At 6 o'clock next morning I found a number of men already on the deck which had just been scrubbed down. At that time we were about at the Saguenay. We were well started on our long journey along the north shore of the St. Lawrence, through the strait of Belle Isle, along the Labrador coast, into Hamilton Inlet and to the far end of Melville Lake, - a total distance of 2100 miles.

At 2.30 p.m. we made our first stop. It was at English Bay, at the Manicouagan River. As usual, there was no wharf at which we could tie up, so we dropped anchor. A sailing boat came out to us, bringing us three or four passengers, including a pere with a beard. Before the boat came up to the ship there were many imprecations on its slowness, but when the people got out on the deck great cordiality was expressed. The visitors remarked that our ship went nearer the shore than usual and our crew talked volubly in return. Indeed the chattering was so incessant that we almost left without delivering a Singer sewing machine. A hand sewing machine had already been put off.

In the afternoon from about 2 to 4 Mr. & Mrs. Maunder, DeLury, Macara, Near, Plaskett, Colling and I formed a circle on the after deck and told stories - or at least some told stories while the others listened - and they were not "sad stories of the death of kings". I wish I could reproduce some of them, but the time and the circumstances cannot be repeated. My room-mate was the chief performer.

The coast is mountainous or rather it consists of rocky hills covered with scrubby  
 trees.

At 4.30 we reached Godbout. Here a river of that name enters the Gulf through a gap in the hills. The beach is sandy and we had to make a detour to get in. We anchored



in the bay and the village boats came out to take off goods, mostly for I.T. Comeau, the merchant of the place. A brother of his had come up from Quebec with us, and got off here while another brother, the most distinguished man of the North Shore, Napoleon Alexander Comeau, came out in his rowing canoe and, after looking through the mail bag for Godbout and picking out the letters for himself, had his canoe lifted on board and he went along with us.

There were about forty houses in the village and new ones were being built. The people, and particularly the children in the boats which came out to the ship, were well dressed and intelligent in appearance.

The Godbout, I was told, was one of the finest salmon rivers in Canada. At this time I believe the "proprietors" of the Godbout were James Law and John Manuel, of Montreal and Ottawa, respectively. From the records I find that between June 7 and July 21, 1905, with four angle-rods 263 salmon were caught which weighed 2962 pounds, the largest being a 33-pounder. This was considered a poor season.

N.A. Comeau (1848-1923) was a notable citizen of the North Shore. At Godbout he was postmaster, telegrapher, deputy coroner, Dominion Government fishery overseer, and guardian of the salmon fishing. His services to Canada and to humanity have been fairly compared with those of Dr. Grenfell. In January 1886 he and a brother effected a thrilling rescue of two friends who had been carried out in their canoe on the 30-mile wide St. Lawrence. It demanded great skill and endurance and they all suffered great hardship. The report in the newspapers stirred the entire continent. A simple but moving account of this remarkable action is given in Comeau's book, "Life and Sport on the North Shore", (2nd ed. 1923). At the end of the book is a list of birds which he observed on the North Shore and reported to the Smithsonian Institution in Washington.

We weighed anchor at 5.30, and in succession we reached at 7.15, Trinity Bay; at 8.27, Caribou Is.; at 9.35, Egg Is.; at 11.00, Pentecost River. At each place the performance was the same.

#### Whaling and Lumbering at Seven Islands

Next morning (Sunday, August 6) I was awakened by our siren at 5 a.m., and when I got up an hour later I found we were anchored some distance out from the premises of the Quebec S. Whaling Co. Here was a large wooden building devoted to rendering whale oil and



other whale products. The animals were chased by a steamboat (perhaps 50 feet long) called the "Falken" and shot with a harpoon gun. They were then towed to the factory where they were drawn up on shore, the blubber was flensed and the remainder was cut in pieces. There was a large carcass on shore partially cut up and another large one in the water.

During the last nine days sixteen whales had been captured, but one a way was the general average. The oil, I was told, was used as a lubricant for light machinery. After discharging considerable freight we steamed over to

Clark City, to the dock of the North Shore Power, Railway and Navigation Co., a company chiefly of Toronto and New York men organized to exploit the pulp and other products of the place. The company consisted of four Clark brothers, one being Wm. C., of Parkdale. The railway was about nine miles long, over to the works on the Ste. Marguerite River. The road had cost \$110,000. The general manager, Mr. Spicer of New York, came up on the steamer from Quebec, and a well-informed and interesting man he was. Two Clark lads from Parkdale were on the dock. One of them showed me around. He expected to attend the S.P.S. in the turn.

We put off much freight and quite a large number of passengers who left the scene on flat cars. On the other hand, a number of passengers got on the ship, mostly to go short distances. Then we went over to

Seven Islands Bay, where the H.B.C. post was and also an Indian settlement. Upon a beautiful beach there were about 125 houses and two churches. Seven Islands is well known in Indian history. It is the southern terminus of the 350-mile railway projected to bring iron ore from the extensive deposits in Labrador and Quebec. Numerous flags were flying in honour of the annual gathering of the Indians, who had marched in procession the day before.

We had many visitors, the ship being surrounded by small boats. In one canoe were three Indians, dressed in their Sunday best, - black coats, cuffs, two with grey felt hats, hair cut a-la-bowl. There were also some well-dressed white people, especially two girls in the stern of a punt.

We put much freight, a large portion for Revillon Freres, the opposition to the H.B.C. in the fur business. This was taken to the fine beach in small punts and then rolled up the shore or carried on barrows to storage rooms.



During the morning there was a service in our ship's dining room conducted by Father ~~vanagh~~ who was assisted by several other R.C. priests. One of them rang the little bell and helped generally. They had cards with the service on them. Two candles were on the altar which was improvised from a square valise, a hat and a camera. The room was full. All the way up from Quebec a stateroom with four berths had been occupied by three Frenchmen who had two cases of brandy. This room was the "saloon" of the ship. It was disgraceful how these men kept up their debauch. But at the service they were all present and very attentive. One of them, with stiff-waxed moustache, was assiduously saying his prayers and counting his beads. We were glad to see them disembark at this place, Seven Islands. At 1.30 p.m. on finishing our unloading, we weighed anchor.

We reached Moisie at 3.40. A well known H.B. Post was located there. Our fine weather of the morning was gone and rain was falling. We left at 5 o'clock and at 6 o'clock the storm was high. Riviere aux Grains was reached at 8.30 and we stayed there all night. Next morning (Aug. 7) we left early and went on to Sheldrake. The water was so bad that ~~XXXXXXXXXXTHEWATERXXXXXXXXXX~~ the captain thought we might have to stay all day in order to land the mail. But at 9 o'clock a.m. five men came out in a sail boat which they manoeuvred in a masterly way until they came smoothly alongside the ship. We gave them a great cheer! Besides the mail they took off a passenger, a spinning wheel, a pasteboard box from a Chicago department store (via Detroit) and two bags of some light substance. Other freight could not be taken off.

Near here the Aronmore, sister ship on this route and much larger than the King Edward, had been stranded on a rock in a fog. The shore is rough, rocky and treacherous. We left at 9.10; almost everyone on board sea-sick.

Thunder River, Magpie, St. John, Long Point, Mingan

To serve these stations required from 9.45 a.m. to 5.15 p.m. They all seemed flourishing. At Thunder River the water was rough but we discharged considerable freight. Two men skilfully handled a big fishing boat and took off 10bbls. of flour and other goods. At St. John River a number of Indians tried to board the steamer but were pushed off by ~~vanagh~~ and Macara, - all but one, who had a \$2 bill in his pocket. The shore about here was not so rocky and forbidding. There is considerable soil, with pine, spruce and birch tree. At Long Point there was a large settlement and many fishing boats at anchor. Half-a-dozen dories came out, each person getting his own freight.



Just before coming to the village we passed the Light House and the coast of Anticosti was visible to the south. At the west end of Long Point was a sign "Telegraph Cable", indicating the terminus of the cable to Anticosti. I was told that Menier, the Paris owner of the big island, came out every summer in his yacht, with a gay company, lots of money and plenty to drink.

The Indian with the \$2 bill got off here. He wore a cap made from a coloured handkerchief.

This afternoon all the passengers were on the after deck in the sunshine recovering from the mal de mer.

The names Mingan, Moisie and some others had been familiar to me since I used the old red Third Reader in public school. The "lesson" in which they occurred was entitled "The Abenaki's Story" and its author was Henry Youle Hind. From 1848-53 he was Lecturer in Chemistry and Mathematics in the Normal School in Toronto; from 1853-64, Professor of Chemistry and Geology in Trinity University, Toronto; and from 1864 was in the service of Canada. In 1861 he led an exploring expedition to Labrador, and in 1863 he published in London "Explorations in the interior of the Labrador peninsula". He took other trips and published other books. He died in 1908.

Mingan was a picturesque place on a fine sandy beach, with hills in the background. Several passengers came on, including two priests and an Anglican parson named Vibert, whom Plaskett brought on deck, and he described the work on his mission.

#### Esquimaux Point

This port, which we reached at 7 p.m., was larger than the rest, comprising about 270 houses. It possessed a good wharf, built by the Government and to it we tied up. Everybody was glad to go ashore. We came across the collector of customs whose name was McGee and DeLury at once sensed he was Irish and made up to him. The collector introduced the party, about a dozen of us, to the Spruce Beer Salon and DeLury insisted that every one should have a glass. The old woman charged 20 cents for all! The drink is made by boiling spruce boughs, adding some yeast, allowing it to stand for 24 hours and then putting it in bottles. After a few more hours it is ready for use. A.T.D. and Father Kavanagh drank "a vous" and there was a jolly time.

Plaskett, Macara, Near and I walked up the long street past a big pile of dried cod under canvas, past the church and on to the schoolhouse. This was a well constructed and



well kept wooden building. I looked within and saw a big stove in the centre and long benches about the wall. Piles of spruce wood outside showed that the school was kept open in winter. The young men and maidens were on parade, and the children on meeting us would touch the hat and say "bon soir!" We also called at Foley's "General Store", a resort for all visitors and village characters. They had some souvenirs, but I suspected they were made at Quebec or Montreal and did not buy any.

Everybody came out to see us. One old north of Ireland man had been to Rigolet (to which place we were going). Mr. McGee told him he ought to go there again, that he might get a young wife. He gave a profane exclamation of horror and declined! We left at 11.30 p.m.

#### Natashquan, August 8

The steamer reached this port about 6.30 a.m. It was the end of the ship's regular "run". In the last few miles of its course it passed through narrow channels in a sea of islands, much like the latter part of the route northward to Go Home Bay. The mouth of the Natashquan River is directly north of the east point of Anticosti while Mingan is almost north of the west end.

Many boats came out to meet us and took off considerable freight, among it being a big tank, some lead and galvanized pipe and a sink for one of the R.C. peres; also some window frames and dressed lumber.

Missionary Vibert got off at Natashquan; his parish included 500 miles of coast.

From Natashquan the ship was our own, - to go where our leader Dr. King directed. When we left port at 8.45 a.m. and began our trip to Rigolet every one was on deck and our flag was flying.

Capt. Belanger now sailed by chart and compass. At first our course was due E (magnetic) 68 mi. and then  $E\frac{1}{2}N$  60 mi. The distance was measured by patent logn. He computed that at 3 p.m. we should have to go 120 mi. to the Str. of Belle Isle, then 60 mi. through it, and then from the outer end (C. Charles), 480 mi. to North West River, or 660 mi. in all.

At 2 p.m. Jennings, on the bridge, shouted that whales were to be seen. All hands looked to the N.E. There were at least two, as two were seen to "blow" at the same time.

On two separate backs and tails could be seen, - about 3 mi. away.

#### Blanc Sablon, Aug. 9

I was awakened at 4.20 a.m. Land was seen close at hand out of our stateroom window and a fog-horn was sounding. We were at the fishing station of Blanc Sablon, just at the



boundary between Canada and Newfoundland.

I got up and dressed, and went with the Purser and Gauthier and two of the crew in a life-boat to the Post Office. We met Mr. Morell who was P.M., Customs Officer, Telegraph Operator and big-fisherman. On the platform outside his office door I saw 7 or 8 partly filled big barrels containing cod livers, and not far away, under cover, a great heap of cod. We delivered the small mail bag to the postmaster, who ran up the flag in our honour and took us into the telegraph office which is a part of the Canadian Government Telegraphs. He said he would report our ship.

The land here is barren. One would think there would be some soil over the big rocky back-bones, but there was no wood and the houses were heated with coal. I was surprised to hear the P.M. speak English, with a slight accent - probably from Jersey, it was said.

When we got back to the steamer it was decided that a courtesy visit should be made to the Newfoundland customs officer, and Capt. Belanger, Purser Bruneau, and Near and Marsh performed this duty. I was informed that the Newfoundland authorities were somewhat jealous of their rights. There was no question as to the position of the boundary here but there was at Rigolet and at other places. The boundary dispute was finally settled in 1927, decidedly to the advantage of Newfoundland; and I am happy to have lived to see Britain's oldest colony become a province of the Dominion of Canada, on April 1, 1949.

While we were ashore a 'steam schooner' from Newfoundland put out for the Labrador. Soon after we left Blanc Sablon we saw two icebergs and a whale, and at 8.45 the captain steered the ship near to an iceberg so that everyone could get a close-up photograph of it. This was near Pt. d'Amour which had a prominent Marconi installation.

While we were at Blanc Sablon Mr. Morell came over to the ship to ask for newspapers, and he brought with him a lot of smelt for bait. Some of these he gave to our camp cook who with others caught a dozen small cod. The water was so transparent we could see them taking the bait. Later, the captain stopped the ship and the purser went in a small boat to some fishermen and short distance away and bought two dozen for 50 cents. We had them boiled for dinner and everybody thought them excellent. We had another unique experience in the strait. The ice in the ship's refrigerator was almost gone and so a couple of the crew went in a small boat to a nearby berg and secured a fresh supply.



We reached Chateau Bay at 1.30 p.m. This is a beautiful land-locked bay almost opposite Belle Island. The entrance is narrow and the rocks on the east side have two peculiar square projections upward. A group of houses was there, and farther on was a straggling settlement. A prominent feature of the place was the Marconi mast. The first useful application of wireless telegraphy was the sending of messages between a ship and the shore. It was only four years before this that Marconi received at Cabot Tower near St. John's, Newfoundland, the first wireless signals sent across the Atlantic Ocean. The Canadian Government telegraph ended at Chateau Bay. A lifeboat went ashore and sent messages to Ottawa and Toronto that all was well with the ship.

After passing through the strait we rounded Cape Charles and steered directly north. As long as the sun shone we went full speed, but later, on account of icebergs, this was reduced to half-speed and then to "slow".

#### Thousands of Icebergs

I was up early next morning (Thur. Aug. 10). The sky was cloudy, the air was cool, icebergs were on all sides and at times we passed very near them. They were truly majestic in their slow-moving dignity. At one time two of our party counted over a hundred in sight. The sea was very calm and we ploughed ahead.

At 8.30 we had turned to the left and were heading for Hamilton Inlet; the opening was not easy to see between the rocky islands. At 10.10 we were just entering the inlet by the passage north of George Island. The rocks were of the familiar bare and forbidding appearance. In some clefts and valleys snow still lingered. Bare, bleak and desolate!

As we moved up the inlet we at last observed signs of life, - a few houses at scattered points on each side. We continued, and passed Discovery Point and Saddle Island, and at last Rigolet appeared straight ahead in the distance. We dropped anchor before it at 2.40 p.m.

At once the captain, the purser, Dr. King, Mr. Macara and some others went ashore to inquire about the passage down Lake Melville to North West River. We learned that L.B. Stewart left here on Saturday, Aug. 5, by sailing vessel and would likely arrive there on Monday. We tried to rent a lighter to help us take off our freight but were unable to do so; however we were assured that one could be obtained at North West River. It was proposed that we engage a pilot, and one was to be had; but he would not go at night and Captain Belanger said he did not need one in daylight.



Rigolet was good-looking place at a distance but not quite so pleasing when close to it. On the wharf were three Esquimaux and also several Indians who were barrelling-up salt salmon. The fish was beautifully clean and attractive in appearance. Alternate layers of salt and salmon were put in the barrel and the balance of the space was filled with brine. Then the barrels were carefully headed and hooped and laid in long lines, ready to be taken to England by the H.B.C. steamer, which at this epoch was the Pelican, although just then it was in dry dock through an encounter with a rock.

The H.B.C. had an important station at Rigolet, the name of the factor at this time being Fraser. I asked him if one might secure some furs to take home as souvenirs. He was not very encouraging. The H.B.C. could not sell any, but he thought some of the natives might have withheld some in the hope of getting a better price.

Around Rigolet there were some spruce trees, about eight inches in diameter, which provided the very necessary firewood.

#### End of the Voyage: North West River

At 2.30 next morning (Fri. Aug. 11) Captain Belanger thought the light sufficient for navigating and we left Rigolet. We went very slowly through the narrows connecting Hamilton Inlet and Melville Lake and then speeded up. At 9.40 a.m. we dropped anchor about a mile from the H.B. Post, which was at the mouth of the North West River, on the North side. The distance we had travelled from Rigolet was about 70 miles, the weather was pleasant and the water calm.

Our siren shrieked, and soon we saw a small boat starting out from the H.B. dock, and when it got closer we saw that it was being rowed by L.B. Stewart. We were glad to see him. He had arrived on Monday, and had soon found a site for making our observations and for our camp, which was very near the central line of totality and was also quite convenient to the Post. The location was exceptionally pleasing. It was about fifteen miles N.E. of the present air-field of Goose Lake.

A party went ashore to look over the ground, and it engaged a schooner belonging to Revillon Freres, who were on the south side of the river, to come out to the steamer, take off our cargo and land it at the H.B.C. dock. They came right after dinner and took half of it in one load. About fifteen of us went along with it and worked hard to unload it and to take it up to the camping ground. In doing this we used a hand-cart, three wheelbarrows and numerous broad shoulders. We got six tents up and all the goods under shelter



by 7 p.m. By that time the second load had arrived; it was left on the schooner until morning. The "working party" got back to steamer at about 7.30, ready for a hearty supper.

The H.B. Post was finely situated at the mouth of the North West River. The agent was H.M.S. Cotter, who had attended Upper Canada College, and the agent for the French company was Michel Duclos. North West River was an important H.B. Post. N.A. Comeau's father was stationed there for seven years and Donald A. Smith (Lord Strathcona) had been there a considerable period. It was he who cleared the area on which we camped, and several of the buildings had been put up by him. Stewart was staying with Cotter. There was considerable spruce in the neighborhood, and more soil than we had seen anywhere else in this north country.

Upon the beach there were three cotton duck tents of ordinary shape each having a camp stove inside with a small stove-pipe going up through the top. They were occupied by Mountaineer Indians and their children had had measles. They were picturesque, and also dirty.

We had early breakfast next morning and all went ashore, along with our baggage.

Then the King Edward, at about 9 o'clock, after a salute with her siren, left on the return trip to Quebec.

#### The Work before Us

There were 17 days before the fateful morning of the eclipse and much work to do. The various groups and individuals of the expedition had definite programs and they realized that there was no time to waste.

The most important part of the equipment was that from the Dominion Observatory. It included four cameras of focal lengths 7, 10, 10 and 45 feet, respectively, and three spectrographs. As it is impracticable to point a 45-ft. camera at the sun, the light from the sun was reflected into it and the other instruments by means of a coelostat. This is essentially a mirror rotated about an axis which is in the place of the mirror and is also parallel to the axis of the earth. The rate of rotation is exactly half that of the earth. The mirror in this case was of glass, 20 inches in diameter, 3 inches thick, silvered on its front face which was absolutely flat. The mounting was very massive and the clockwork driving the mirror very accurately made. The whole instrument weighed 2500 pounds. The coelostat and the cameras and spectrographs had to be mounted very solidly and placed in exactly the right positions with respect to each other so that at the critical time of the eclipse the rays from the sun would be reflected exactly into the instruments. This called



for the construction of cement piers placed precisely in the correct positions.

Immediately Plaskett brought out his carefully drawn plans and we began the excavation for the piers. We had brought 10 barrels of Portland cement and bags of sand, too, but as there was plenty of sand right at hand we left the bags on the ship for ballast. Near and Plaskett and DeLury mixed cement, while I put together the moulds for the piers. They had been made at Ottawa and shipped "knock-down" to save space. We made rapid progress.

We brought with us the 4-inch telescope belonging to the R.A.S.C., and with it Dr. King expected to observe the four contacts, i.e., the moments when the circumferences of the sun and moon touched.

Another important undertaking was that of the Meteorological Service. It was to determine the magnetic elements (i.e., declination and horizontal force) and the temperature and atmospheric pressure, by self-recording instruments and also by eye-observations. To William Menzies, a veteran of the service, had been assigned this task. By working night and day he managed to build his hut and get his instruments in operation in a very short space of time. A continuous record was obtained from Aug. 17 to Aug. 30. He was ably assisted by DeLury and Gauthier. His results are of permanent value.

DeLury assisted Dr. King in some computations and intended, during the eclipse, to make visual sketches of the corona, and also to note any variation in the electrical condition of the atmosphere.

Mr. E.W. Maunder of the Royal Observatory, Greenwich, and Mrs. Maunder, both experienced eclipse observers, brought three equatorially mounted cameras of different sizes, all to photograph the eclipsed sun, and they were to be assisted by Jennings and Upton.

Rev. D.B. Marsh and G.P. Jenkins, of Hamilton, had a 5-inch clock-driven telescope with a grating camera attached to it, and two smaller telescopes, with which they intended to take numerous photographs of the partial and the total phase.

J.R. Collins of Toronto had a telescope of his own design and construction, and intended to take a rapid series of photographs during the entire time of the eclipse.

Father Kavanagh had an arrangement to cut out all but the outer coronal streamers of the sun and he intended by direct vision to note any changes in them during the total eclipse.



L.B. Stewart determined accurately the position of the camp Long.  $60^{\circ} 7' W.$ , Lat.  $53^{\circ} 31' 31''$ , surveyed the land in the neighborhood, and in addition, by using a pendulum apparatus similar to that of the U.S Coast and Geodetic Survey, measured the force of gravity,  $g = 981.34$  dynes.

His results are also of permanent value.

A.S. Johnston (B.A. '85 Tor.), editor of the Technical World, Chicago, hoped to photograph the peculiar phenomenon known as the "shadow bands".

I myself proposed to determine the nature and the intensity of the polarized light emitted by the corona at different distances from the sun's limb. Eye-observations were to be made with a polarimeter designed by E.C. Pickering and constructed by Brashear. Also, photographs were to be taken with a camera attached to D.B. Marsh's equatorial, in which a double-image prism was placed in front of an achromatic lens of one inch aperture and focal length 36 inches. This camera was to be in charge of Father Lajeunesse.

#### Life at the Camp

One of the prominent features as one approached North West River was an old church close to the H.B. Post, dating from 1873, and discarded after twenty years of use. It had no doors, windows or floor, but Father Kavanagh "rigged up" an altar and said mass at 10 o'clock on Sunday (Aug. 13). Gauthier assisted him, and a number of good Protestants were pleased to listen to the kindly priest. About ten Indians were present. L.B. Stewart told me that one of the Indian women gave birth to a child earlier in the week and that on the next day he saw the mother moving about gathering firewood outside their tent! At mass the women sat on their feet while the youngsters lay on a heap of shavings on the ground.

In the afternoon at 3 o'clock in the big dining tent there was a divine service in which members of the expedition took part. On this Sunday Jenkins led in the Lord's Prayer, Maunder read Ps. 19 "The heavens declare, etc.", Jennings read an Anglican prayer and Marsh preached a simple and modest sermon. On another occasion Maunder gave an address on "Job". There was a large attendance at these services.

We had much cold and rainy weather and although the temperature probably never fell below  $50^{\circ}F$  we were uncomfortable at night. Late one afternoon DeLury and I paid a visit to the French company across the river. The former bought a pair of seal boots and some socks, and Duclos, the agent, loaned him a sleeping-bag and his komatic shoes. A komatic is



the sled drawn by dogs over the snow. I sewed my four army blankets to form a bag and wore the komatic shoes and was even then only moderately comfortable.

I noticed many mice around the camp. They were fat stubby fellows, in size about mid-way between a mouse and a rat seen in Toronto. They ran about the tent and were not at all "scary". They had holes in the sand. I presume they were lemmings but cannot say to which of the very numerous species of small rodents they belonged. One day I killed four, one in the tent.

About 9.00 a.m. Sunday, Aug. 20, there came to our dock a barge well-loaded with visitors. They were from a sawmill settlement about ten miles away named Gillisport after the manager of the works which were owned by a Nova Scotia firm. I counted 62 as they disembarked. Father Kavanagh's mass in the morning and our service in the afternoon were well attended and all seemed interested in our camp. They invited us to visit their settlement two days later and offered to send a small steamer to transport us. So on Tuesday at 9.30 a.m. the Str. Aid arrived and took away all of our party but four - Plaskett, Stewart, Hazies and DeLury. At Gillisport we were somewhat surprised to find two large steamships being loaded with spruce deals (3-in. planks). Our party was divided into two sections, one dining on board the Briardene (Capt. Crowe), the other on the Lord Londonderry (Capt. Girvan). After this we all went ashore and inspected the town and the mill property.

We had a very interesting time and at about 6.30 started for home on the Aid. Her captain was F.G. Rudolf of Halifax, a cousin of Dr. R.G. Rudolf, one of my Toronto friends. Captains Crowe and Girvan went along with us. We had tea and biscuits on board and put in a very pleasant time, but just as we approached our Point we grounded! The steamer was going very slowly and we went on the shoal gently. Steaming would not get us off, so an anchor was carried out to aft of the ship but the winch would not loosen us. We had to be taken ashore in small boats. Had supper at 10 o'clock. High tide was at 2 a.m. When we looked out in the morning we saw that the ship was gone - the high water had released her.

We had another interlude in our strenuous labours. Notwithstanding the large amount of lumber we had brought on the ship, to be used for building the huts and shelters which required, Mr. Plaskett found the supply to be running short, and he was pleased to learn that more could be obtained at Gillisport. He ordered 250 feet and it was delivered at the H.B. dock. To help in taking it up to the camp Mr. Cotter offered to hitch his six-dog team



to our hand-cart. Everybody turned out to watch the performance. Each dog had his own harness and was connected individually to the cart, and Mr. Cotter showed how to manage them. The job was soon completed and many interesting photographs of the operation were taken.

One of the sparse population of this country was Joe Michelin who lived about 30 miles away. Some one had told us that he had on hand some skins which he might sell us and apparently had passed the word on to him. At any rate he came up in his sailing boat, and DeLury and I went down to see him. We each bought a bear-skin for \$12, and later in the day our friend Cotter intimated that the price was pretty high. In the evening we were gathered about a bonfire telling stories. DeLury made some joke about Michelin having "scooped" us, and just then he appeared in our midst wearing a bland smile. We asked him about any incidents in his hunting life and he told us that on one occasion he got into a bunch of six bears which had been disturbed by him. He managed to escape by reason of the thick bush which prevented the bears from telling whither he had gone.

Fournier of the French post had told me of the strange tracks and the odd animals which were seen at Michelin's place and I asked about them. He said the animals were first seen in the spring of 1904. He himself had not seen them but his daughters had. There were three, two larger ones and a smaller one. They walked on two feet like a human and bent slightly over with the head projecting forward. The hands seemed to have claws and the feet had two toes, one on either side of the middle portion, otherwise the footprints resembled those of a man. They were taken to be father, mother and son. The older one was seen by a daughter one day and he beckoned to her to come to him. Fournier went up to investigate, and was convinced of the correctness of the report, and he set three bear traps to catch them. Some footprints were seen this year (1905) but nothing during the winter. The older one would eat vegetables in the garden, and skins of mice were found nearby as though he had eaten them. His weight, from the impression in the earth, must have been 600 pounds. The family were greatly disturbed and slept upstairs with rifles and revolvers beside them. Joe would not venture far in an explanation of them.

It seemed to me that they were of the "wendigo" type of being imagined by the Indians essentially human but of monstrous size.



### Overcast Sky and Good Fellowship

By the time the installation of our apparatus was completed we realized that the probabilities for good weather for the eclipse were not very great. Of the first ten days at the site only two had a clear sky in the east at the time of the total phase, and on August 25 we concluded that the chances of success were about 1 to 7. But fears for the result did not deter us from perfecting every arrangement. Indeed some of the party continued their work into the night. Most of the members, however, as the darkness came on and the temperature fell, would gather about a bon-fire, and the amount of talent exhibited in song, story and recitation was astonishing. There was present a genuine spirit of good fellowship, and each freely did his best to amuse the rest of the company. Dr. King recited several of Bret Harte's poems, Gauthier and Fr. Kavanagh sang "Allouette" and other French Canadian songs, Collins recited his "Old Mother Hubbard" sermon and other pieces - indeed he seemed to have swallowed an "elocution book", Cotter sang "Fifty-five below" and "I want to go home to my ma", DeLury sang "The McIntyres" or told one of his innumerable good stories. At one time, after two days of continuous cold rain, a fire was built within the old church; and though the smoke was dense enough to bring tears to the eyes, the genial warmth made us entirely happy. The fire was kept blazing far into the night, and sitting about on boxes and stools, or lying on an old dismantled birch canoe, the song and joke came forth with peculiar spontaneity. This was the best bon-fire of the trip; to me a pleasure I shall never forget.

### A Great Disappointment

Monday, August 28, was an incomparable day. The sky was blue from early morning, and we wished we could bring the eclipse on then! That afternoon the King Edward arrived with the second portion of the expedition. These were to assist at the time of the eclipse, and the steamer was to wait and take us all home together. But at night the barometer fell, and next day was continually wet. Still our rehearsals continued, hoping for a bright morrow, which did not come!

On August 30 we rose at 6 o'clock and soon after went out to await the eclipse. The total phase was predicted for 7.52. Anxiously we looked to the east, but the gray clouds remained. As the time approached the darkness increased, and during totality it was so great that one could not read one's watch easily. This lasted for about two and one-half minutes, and then the sky rapidly brightened, first in the west and then everywhere. It was a weird and impressive sight; but the total phase had passed, and we had made no observations! It was a great disappointment.



About forty-five minutes later the clouds parted sufficiently for us to see the moon still hiding a portion of the sun's disc. But this was of no scientific value, and in our disappointment we could scarcely look at it.

In addition to those I have mentioned the following were on the expedition:

W. George, (Steward), Ottawa; H.H. Lyman and W.E. Lyman, Montreal; J.A. Russell, Windsor, N.S.; M. Aldous, Winnipeg; Miss W. King, Ottawa, daughter of the head of the expedition, and Mrs. S.T. Codd, Winnipeg, her grandmother.

#### Getting ready to Depart

The next act in the drama was to dismantle and pack up. We began at once, and before the day closed most of the boxes, large and small, were taken to the schooner dock. I looked after the hand-cart and was ably assisted by Maybee and Howell and two half-breeds. The next day was fine and the tents were struck, as we proposed to sleep on the steamer that night. It was about 6 o'clock when the last pieces were taken<sup>down</sup> to the dock, and the schooner was almost loaded; but in the meantime the wind had freshened and the waves were too high for the schooner to leave the dock. Some of the party went out in a small steam launch which had brought from Gillisport Mr. & Mrs. George T. MacNutt of Sherbrooke, N.S., who wished to go out on our ship, and some more went in a ship's boat. These vessels were badly tossed about, and when the launch came back to the dock it refused to return to the ship. The wind became stronger and then the rain began to fall, so there was nothing to do but make the best of it on shore.

Mr. Cotter invited us all up to his house, where he gave us tea and sandwiches, and we sat about until later in the evening, when we disposed ourselves for sleep. Plaskett and Near went back to their old dark room; Collins, Maybee and Howell put up in the old church where they built a fire, the cook and cookee went to Menzies' hut and the rest of us stayed in Cotter's house. In one room six of us lay on the floor - Marsh, Jenkins, Stewart, Kavanagh, myself and DeLury, in that order. We had bear-skins under us and blankets over us. I took off my boots but not much else. My pillow consisted of my coat on some books. It took me quite awhile to get to sleep. About 11.30 Cotter looked in on us with a candle in his hand. I glanced up and grinned and DeLury smiled. Cotter asked if we wished some sandwiches and I said not until morning, but DeLury said "yes" and took two, which he ate. In the meantime we had wakened Kavanagh and perhaps Marsh. We had some jokes while Cotter climbed over the stove to get to another part of the room. Finally he went off and we lay to rest again.



I heard it strike 1 o'clock but then dropped off and slept.

In other rooms the floor was well covered with sleepers - about twenty in all - including Capt. Crowe and the chief engineer of the Briardene, who were in charge of the small launch.

Next morning the wind had fallen, and as soon as possible we went out to the ship, quickly transferred our goods, and after affectionate farewells and hearty cheers, started on our homeward trip. At Rigolet we found Dr. Grenfell, and most of us had the pleasure of meeting the famous missionary and of inspecting his ship, the Strathcona. We learned that the Lick expedition, which had located on the coast near Cartwright, had been as unfortunate as ourselves. In Spain and in Egypt, however, the sky was clear and good photographs had been secured.

There is little to report about our return voyage. The ship was almost filled on leaving North West River, but at Natashquan on Monday, Sept. 4, about thirty passengers came on board and it was overcrowded. At supper there was a scramble for seats and DeLury tried to have a place kept for three Sisters, but there was little of the spirit of chivalry among the crew - or the passengers! I spoke to the Purser later in the evening. He said he had urged the ladies not to get on but to wait for the Aronmore, but they did not see their way to do it. They were on their way to begin teaching and the schools were about to open. The Purser said they were used to hardships, like most of the Priests on the North Shore. However the Captain added a brighter colour to the picture. He vacated his cabin in order to let the Sisters occupy it, and went "below" and slept on some boxes, with his boots and socks off and his "feet hanging over". I actually saw this myself.

Next day the sea was too rough to land at Chaloupe. The wind was on the quarter and the ship rolled fearfully. I watched the pendulum on the back of the chart room and at one time it swung  $26^{\circ}$  to left and  $32^{\circ}$  to right, a total oscillation of  $58^{\circ}$ . At dinner the dishes slid about the table in an alarming way.

At Seven Islands a young H.B. man named McLeod, who had accidentally shot himself in the leg below the knee, was brought out on a stretcher and hoisted aboard. He was to be taken to Quebec and perhaps to Montreal.

We reached Quebec dock at 10.30 a.m. Sept 7. We were sorry to leave the ship and to break up the party. A more courteous and cautious skipper than Capt. Belanger, a more accommodating officer than Purser Bruneau, or a more obliging ship's crew we felt we should never











## XV. A Summer at the Lick Observatory

### 1. THE TRIP TO THE OBSERVATORY

#### Darkness before the light

For some years around the betinning of the present century there were recurring difficulties in the management of the University of Toronto. They arose chiefly through an unfortunate division of authority, interference by politicians and niggardly treatment by the provincial government. There were other causes, too, as I well knew, since I was in the "midst of things".

But relief came at last. In October 1905 a Royal Commission was appointed to inquire into and report on the management and government of the University of Toronto; and, based on its findings, the University Act was passed by the Legislature in May 1906. This provided a new constitution for the University, under which it has grown peaceably and developed enormously.

James Loudon resigned as president in 1906 and Maurice Hutton, professor of Greek, was Acting President until a new president should be appointed.

In 1907 my position was changed from Lecturer in Physics to Associate Professor of Astrophysics, which gave me a separate department of my own, with an appropriation to carry it on. I realized that I lacked training in practical astronomy, and wrote to the Director of the Lick Observatory in California to ask if I might spend the summer of 1907 at that famous institution. He very cordially invited me to do so. Acting President Hutton strongly approved my proposal and secured an appropriation of \$100 towards my expenses.

#### Trip to California

I was ready to go on Sunday, June 2. In early afternoon Andrew Elvins, the "father of the R.A.S.C.", called to say good bye; and later came J.R. Collins, the secretary of the Society from 1902 to 1917. Among the matters we discussed were: new quarters for the Society in the University Main Building, the employment of Robert Tyson as assistant in the office, the revision of the constitution; and I asked him to supervise the publication of the Journal which I had started in January and which was being printed by his brother. Then we two rode on our bicycles to the Union Station and had my trunk inspected by U.S. Customs Officers and then checked to San Jose, California.



I had borrowed a 3A Folding camera from an Ottawa astronomer friend and the first picture on the first roll was of my wife and three children in our back-yard at 52 Avenue R Road, Toronto. At bed-time I said good night and bood bye to the children, and at 10.30 good bye to my beloved Jean, and started for the station. My berth was lower 7 in the Pullman which bore the name "Japetus" - a far-out satellite of Saturn.

Next morning at 6.30 E.S.T. the train emerged from the Sarnia tunnel, with its evil-smelling gases, and was 355 miles from Chicago, the 47th street station of which was reached at 1.45 p.m. I took street car to the University where I was met by my friend Lachlan Gilchrist ('04 U. of T.) who was a graduate student in the University of Chicago. He showed me about the place and introduced me to R.A. Millikan. Then we went over to the Anatomical Building to call on R.R. Bensley, (B.A. '89, M.B. '92), who had recently been Demonstrator of Biology in Toronto and was given a superior position in Anatomy in Chicago. Bensley, I may say, regularly spent the summer at Go Home Bay, Georgian Bay.

I left Chicago at 11 p.m. by the C. & N.W.R. My ticket was a yard long.

Next morning at 10.30 we were at Ontario, Iowa, and as we were stopping for a train-crossing I took a photograph of the station bearing that familiar name. Indeed I have found that name in almost every state from Atlantic to Pacific. At Council Bluffs, Ia., we crossed the yellow Missouri river to Omaha, Neb., arriving there at 4.45 and leaving at 5.15 p.m.

Omaha did not impress me very favourably. There seemed to be much business, however, with numerous railway connections. We had changed to the U.P. line. At South Omaha there were extensive cattle yards with their unpleasant odour. I also saw a mule market, which was a novelty to me. There were eleven heavy cars on our train.

In the evening (Wed., June 5) there was a scramble for supper and I sat beside a man who lived in Denver. His name was E.E. Shumway. He was president and general manager of the Rocky Mountain Fuel Co., a prominent Methodist, and a well-informed man. He urged me to stop over at Denver and visit the Chamberlin Observatory which was a part of the University of Denver and was in charge of H.A. Howe. I told him I was anxious to push ahead, and the U.P. train seemed to be making good speed. But in the morning we were  $2\frac{1}{2}$  hours behind time! The country was quite level in the valley we were following (Platte), but the soil was light and required irrigating from the nearby river. Poplar trees and alfalfa seemed to be the prevailing vegetation.



About half a mile from Weldon Station, Colorado, the train stopped. On investigation I found the engine in trouble - the boiler leaking. I got out and photographed the train, and noted sage-brush, cactus and alfalfa growing, and a lively irrigation stream flowing in a ditch alongside the track. We pulled into Weldon at 8.30 C.S.T. We stayed there a while and then started again and eventually reached Orchard, 79 miles to Denver, where we stopped until a freight engine arrived to help us. There was much delay during which everybody got crackers and soft drinks at the village grocery. In this place I saw several sod houses and a prairie schooner. At last, at 12.10 C.S.T., we started forward, but just 15 minutes later we stopped violently - our Mogul engine had broken loose! Again it was attached and at 12.30 we moved forward, and at about 3 o'clock we reached Denver. Of course my connections were broken, and I decided to stop over until the morning.

I went with Mr. Shumway to his office and he telephoned to Dr. Howe at the University of Denver. After viewing the city for a couple of hours and obtaining some pleasing pictures from the tower of the Capitol, showing the Rocky Mountains in every direction, I went to the University, and Dr. Howe showed me the Observatory, which was founded in 1890. It had a 6-inch lens by Clark and a 5-inch meridian circle. Howe was the author of an excellent book on descriptive astronomy which I had read and I was pleased to meet him. I went over to Shumway's for dinner and after that back to Howe again with whom I stayed until 10 o'clock. Then I picked up my suitcase at the station and went to the Oxford Hotel where I secured a good room for \$1.50.

This delay allowed me to become acquainted with two of the most obliging men I have met. Mr. Shumway told me that the railway had allowed its rolling-stock to deteriorate while it spent excessive amounts on an extension from Salt Lake City to Los Angeles, Cal.

#### Royal Gorge and Salt Lake City

The Denver and Rio Grande Railway had the reputation of following the wildest and most picturesque of routes. The train left Denver at 8.30 a.m. at an elevation 5279 ft. First of all it dropped a few feet and then it began to rise steadily. At Castle Rock, 32 miles south of Denver, the altitude of the track was 5823 ft. Here was a most unusual formation like a great castle far up on a rock, and just at its base, close to the railway track, was a cattle yard for shipping cattle. Indeed this was a familiar feature in the middle west. Twenty miles farther on is Palmer Lake, a fine clear sheet of water at an elevation of 7224 ft. At 75 miles was Colorado Springs, a noted health resort and the seat



of Colorado College, and a beautiful, well-kept place. All along I watched the snow-covered peaks in the west. Often it was difficult to distinguish the peaks from low cumulus clouds in the sky. It was fascinating to try to do so.

Then we went on, two engines puffing to take us up the grade, and reached Pueblo, an important city, at 12.25, 15 minutes late. At Canyon City at 2.15 an open observations car was coupled on behind and the passengers filled the seats. For an hour we swept onward, following the course of the turbid, swift-flowing stream and winding about the odd-shaped red rocks. I noticed that in many places the telegraph poles were iron rods drilled into the solid rock. Thus we saw the Royal Gorge, Grand Canyon of the Arkansas. This river rises in the mountains of central Colorado at an altitude of over 10,000 feet and after flowing 2000 miles across four states it empties into the Missouri River.

We reached Salida (215 mi., 7050 ft.) at 4.05 p.m., an important mining centre with many smelters in operation. At several places I had seen a third rail to accommodate the narrow-gauge mineral trains, but in the railway yard here were many of the ore cars, showing various colours. I supposed the yellow was due to gold, the brown to iron and the light colour to silver, but sometimes many colours were present at the same time. I felt that the interior of the earth was on exhibition here.

After this place we reached Buena Vista (7958), Granite (8930), and Malta (9578), and all along here the mighty, snow-topped peaks to north and south rose majestically to the sky, while alongside us ran the turbulent mountain stream.

Finally in our upward climb we reached Tennessee Pass (281 mi., 10,240 ft.). At this place the train was carefully inspected as here we cut off one engine, since our course now was down-grade. In 8 miles we dropped 1000 feet. At about 8 p.m. we reached a divisional point named Minturn, in the midst of much mining. The train halted and a 'bunch' of youngsters crowded about the observation car which was open at the rear end. One of the girls on the train introduced a man passenger as President Roosevelt ("Teddy" of course) and a lady as Alice Longworth! The children were surprised and taken a-back, but were made happy when a passenger gave them a nickel apiece. At Glenwood Springs (360 mi., 5747 ft.,) reached at 10.05 p.m.) was a noted health resort.

As we went down hill the sights were wonderful, almost more so than the Royal Gorge. The bluffs close to which the train passed, often, I believe, stretched half a mile almost directly above us, and at numerous places could be seen the mouths of mines. The thought



came to me that these were openings to subterranean caves in which lived great wild animals. In some cases the miner had quite an outfit for getting out his ore. Far up one would see a plain shanty and a dump, and sometimes one could not see the trace of anything which had been taken out of the hole. I saw hundreds of these mines as we hurried down the mountain beside the rapid stream, - in this case the Colorado River, which first flows west and then south-west into the Gulf of California.

In the morning we were still among the mountains. At times the bluffs were yellow sandstone (I suppose) and often in extraordinary shapes; and again there were high banks of great gravel-heaps, with rocky ledges in them and scrubby evergreen, which looked like red cedar, about them.

As we moved onward the individual snow-capped peaks came more fully into view, and the clouds resting on their summits gave them an impressive majestic appearance; and, proceeding still farther, the mountains separated and we reached the fertile Salt Lake Valley where grain and fruit trees abounded. But even among the mountains I had sometimes seen a fruit orchard close to the railway. Also, in some places the hills were covered with sage brush, which, one of the men remarked, was a true sign of the west.

We reached Salt Lake City at 11.10 a.m. (Friday, June 7) and I decided to stop over there. So I went up to the reputable Wilson Hotel and got a room at the reasonable price of \$1.00.

In the afternoon I had a 2-hour ride in a sight-seeing street-car. It was filled and the guide did not lack words in describing the city's interesting features.

Salt Lake City was a most extraordinary place and I presume its essential nature is still the same. There was a strange commingling of twentieth-century American business "push" exhibited in large establishments using electric light and power, in up-to-date restaurants and hotels, and yet right in the midst of it was the Mormon organization with its exclusive Temple and its Tabernacle and special rites and laws suggesting the old Israelitish dispensation.

I gazed on the Temple, Tabernacle and College of the Latter Day Saints which were on grounds surrounded by a high wall within which no one was allowed to smoke - no hardship to me! An information bureau at the entrance to the grounds was conducted in the most courteous and obliging way. When I spoke to the one in charge in regard to his extreme consideration for visitors he said the authorities were anxious to remove the prejudice which many



strangers seemed to have.

At 5 p.m. I went to the Tabernacle to listen to an organ recital scheduled to occupy forty minutes. Promptly at 5.10 the doors were locked, and the chairman, an old man wearing a skull-cap, asked any one who wished to retire to do so at once as the doors then would not be unlocked until the recital was over. After two numbers, he got up and "called down" some girls who were talking. No applause was allowed. Perhaps a thousand people were present - in the gallery. The programme contained five numbers. They were given with much skill and ability. The organ was a fine one and could imitate the human voice in a marvellous way.

There was rain in the afternoon, but few of the people used rain-coats or umbrellas.

I looked up the City Directory and found that Ambrose Noble McKay, a member of the Class of '90 at the U. of T., was managing editor of the Herald. I walked up Main Street and soon found the office; I inquired within and soon found the man. McKay, I believe, came from Saintfield in Ontario County, Ontario. We had an interesting talk. He had been in Salt Lake City for twelve years. First he was on the Tribune, but left it for the Herald, W.A. Clark's paper. He asked me about our fellows - DeLury, Bonner, and others. I told him about the University and he told me of Canadians who had made good in the west. He offered, if I would stop over a day, to have me go down in one of the mines. He said Salt Lake City was one of the prettiest of cities. Its streets are usually two chains (132 ft.) wide and they run accurately N-S, E-W. The city blocks are 40 rods square and thus contain 10 acres. The early settlers planted many locust trees, but they were being outnumbered by the box elder. Tall poplars were also numerous and prominent. Stone was comparatively easy to obtain and many of the buildings were constructed from it, some of them being very handsome. But some of the old adobe houses were still to be seen.

The rain continued much of the night. I left Salt Lake City next morning (Sat., June 8) at 10.55 a.m. At 12.05 we were in Ogden, 36 miles to the north. I walked up wide 25th Street from the Union Station into the rather imposing Bon Ton Restaurant. I found its proprietors were Sing and Wong, two Chinese gentlemen. I had never been in a Chinese restaurant before. But everything looked clean and respectable. I asked for their ordinary dinner, which they advertised for 25 cents. I was simply overwhelmed with the profusion of dishes they brought along: soup, two meats, potatoes, spinach, rice, and another dish I did not recognize. Then pie, ice-cream and cake, bread and butter, doughnut and sweet sauce, and coffee! All clean and presentable.



After this, in an interval of clear sky, I went out with my camera. Ogden had a population of 80,000 and the streets are wide with electric power poles in the centre, as in Salt Lake City. There were many trees, box elder, locust and poplar, which gave it a fresh and pleasant air. I obtained a picture of a small adobe house with mountains in the background. Also, one of the Carnegie Free Library, a fine cut-stone building, finished inside in polished oak. Carved over the entrance was: "In the education of its people is the safety of the Republic". It was erected in 1901.

After long delay we started forward at 4.11 p.m. We went directly westward and crossed the Great Salt Lake on the famous Lucin Cut Off, which is a combination of fill-in and trestle-work, 27 miles in total length. I had read about it when it was in course of construction a few years earlier. Before it was in existence the train had to continue farther north and then along the north shore of the lake, and the route was mountainous, full of heavy grades and serious curves, so that only short trains drawn by two engines could be used. The new viaduct saved all this. The old route and the new came together at Lucin, in the west part of the state, 103 miles from Ogden. By 6 o'clock we had crossed the Lake and had entered on the great Salt Lake Desert. For many miles not a vestige of green could be seen from the cars. It seemed a dead level plain with flakes of clay left after the water had evaporated. All this time the hills to the north and the south could be seen, usually with streaks of snow on them.

Among the passengers in the car was J.L. Ord, Superintendent of Construction for the W.U. Telegraph Co., with office in San Francisco, and his wife, and they had a good Victor graphophone which they played almost continuously from 5 to 9 p.m. for the entertainment of their fellow-travellers. Everyone enjoyed the interlude.

Next morning we were at Jumboldt, which is the name of an important centre, as well as of a range of mountains and of a river system in Nevada. It was pleasing to see the trees again - mostly poplar and locust - after so much sage-brush as we passed on our way.

We continued westward and at 12.45 p.m. we were leaving Verdi, which is just within Nevada, with two engines pulling the heavy train. We were in the midst of fine mountain scenery and, as usual, the track was beside a rapid stream. At 2.15 we reached Truckee, 24 miles farther on, in California. This appeared to be a busy place. There were many stores among the buildings on the streets which were parallel to the railway track. In many cases there was a stairway at the front of the house leading up to the roof of the verandah.



Often there was a saloon below, a lodging house above. I noted also two flat-cars connected together, on each of which was a 4500-gal. tank and the two tanks were joined by a rubber pipe. On the back of the rear car was a hind-light. The engine connected to the front car had on top of its boiler a force pump. I learned this outfit was for the protection of the snow-sheds, which were altogether about 40 miles in length on the mountains, which we would come to later. These were of the Sierra Nevada range, and the scenery as we circled round and round, ever rising higher, was magnificent. At first the snow was all above us but at last we could see it through the horizontal slits in the snow-sheds on the same level as we had attained. At the summit the train stopped for some minutes and some of us got out and made snow-balls! This was at an elevation of 7018 feet, on July 9. The day was sunny and the snow packed well!

On leaving the sheds we started to descend and the scenery began to change. Soon grape-vines, olive and other fruit trees were commonly seen, and also I noted where immense masses of the hills had been washed away by high-pressure hose, in the search for gold.

We reached Sacramento at 9 p.m. At this place there was a huge train ferry, but it was out of order and we had to go via Stockton, adding sixty miles to our trip. In the morning I awakened at Oakland Pier, which place we had reached at 2.45 a.m.

In the morning (Mon., June 10) I went by ferry over to San Francisco and took my suitcase to the S.P. Station at 3rd and Townsend streets. Then I started out to inspect the town. Truly it was in an awful condition. The great earthquake and the accompanying fire occurred on April 18, 1906, that is 14 months earlier, but everywhere there could still be seen burnt walls, twisted iron beams and rods, great quantities of building materials and dirty streets. Some asphalt pavements, it would seem, had been put in motion like the waves on the surface of the sea and had been fixed in that shape, and the rails of a street-car track had great wiggly curves in them. While I was taking photographs of some of these ruins two men came up behind me and began to talk to me. I turned, and judged them to belong to the underworld. They brought out a pack of cards and wished me to join in a game. I suppose they thought I was a green stranger. I was really frightened and parleyed with them until I had closed up my camera and put it in its case, and then I managed to slip away from them.

Then I took a car up to Golden Gate Park. I thought it beautiful. Most of the trees I could not recognize, but the picturesque palms pleased me greatly. They were the first I had seen growing unprotected in the open air. There was a fine cluster of them about the



monument of James A. Garfield (1831-1881). I also noted some fuchsias growing alongside cottage and reaching to its eaves.

At 3 p.m. I left on the S.P. and reached San Jose at 4.30. The first thing that attracted my attention was the show of geraneums planted along the railway tracks near the station and remaining there all the year rouns. I made inquiries for my trunk and learned that it had arrived several days earlier. I took the bus to the excellent St. James Hotel, and arranged for the Mount Hamilton stage to call for me in the morning and also to pick up my trunk.

In the evening I went for a trolley ride to Santa Clara which was an important town almost adjoining San Jose on the north-west. It contained big canneries, dried-fruit plants and other industries, and was also the seat of the R.C. University of Santa Clara. I noted that the haying operations were well over and the fields were becoming yellow, indicating the end of the rainy season. There was an abundance of prune trees, for which the Santa Clara is famous, and big palms were to be seen everywhere.

Next morning I had breakfast at 6.30, packed my bag and went down to wait in the hotel lobby. The 2-horse stage came round on time and at 7.30 we left in a drizzling rain. In addition to my suitcase and trunk the stage carried mail bags and loose mail and freight for places on the route. I noticed that the carriage had been freshly varnished and that the waterproof aprons to go over the passengers' knees had been carefully cleaned, folded and put away. Supposedly the rainy season was over; but the drizzle continued. Finally the driver stopped, got out an apron, and to me sitting alongside him, called out: "Pardner, put that over you and keep dry!" I joshed him about sunny California, but my words ran off him like the water off his hat. The driver's name was Jamieson, and he was well known in that part of the country. He was red of countenance, but not through drinking, and wore a water-proof coat and yellow hat of cowboy shape.

A short distance on our way we passed some fine big trees full of blossoms and in answer to my inquiry he said they were pepper trees.

We picked up the young woman-teacher at Huycke's, six or seven miles up the road, and dropped her at her school. Smith's Creek was reached about 11.45, and notices posted there warned visitors that there was no hotel accommodation at any place farther on. We lunched here, and started again at 11.45, with a second change of horses. The rain continued and the mountain was so enshrouded in mist that none of its interesting scenery could be



enjoyed. At about 1.30 we reached the summit.

## 2. AT THE OBSERVATORY

Prof. R.H. Tucker welcomed me to the Observatory and introduced me to some of the others who were on hand to meet the stage. Besides the permanent staff there was always a number of young men learning to be professional astronomers. They were usually graduate students of the University of California, of which the Lick Observatory was a part. A few minutes later the director, W.W. Campbell, came along and greeted me cordially. We discussed briefly my course of work and he assured me every facility would be at my disposal.

Mr. Tucker showed me my room in the living-house, which was prominently seen in photographs of the Observatory taken from the east. It was a 3-story brick structure built on the side of the hill and every flat was on the ground floor. In the recent earthquake it had been seriously damaged and a big crack could be seen in the front wall. A few years later it was replaced by a better-planned house constructed of reinforced concrete.

Mr. Tucker was a bachelor and had rooms in the house. He was in charge of the "senior mess", which included the unmarried members of the staff, and to this I was added. A kindly Irish woman named Annie Kelleher kept the house. I paid a dollar a day and the book-keeping was of the simplest kind.

Breakfast at 9, lunch at 1, dinner at 6. Those were the hours Mr. Tucker gave me, and he punctually observed them.

### The Founding of the Observatory

In reading the history of the Lick Observaotyr I thought I could always recognise romance as well as seriousness of purpose in all those connected with the establishing of it: - in its founder; in the men who advised regarding its location; in those who devised the details of construction of the great telescope; in the workmen who produced the equipment; and in the men who prepared the peculiar buildings in their detached location on the mountain top.

The observatory began its scientific work on June 1, 1888, with a staff which showed great ability and devotion to the study of the universe; and ever since then it has maintained a high reputation for the quality and the significance of its researches.

The chief glory of the observatory is its 36-inch refracting telescope; it was the largest in the world when built and there is only one greater at the present time. Indeed



the evidence was continually being obtained that the 36-inch lens was unequalled for quality.

At the beginning of the present century one of the most pressing problems in astronomy was the accurate measurement of the velocities of the stars. Director Campbell fully realized this, and, with funds supplied by D.O. Mills, he had a spectrograph constructed according to his own design. This he attached to the great telescope and then he started on the task of determining the radial velocities of all the stars down to the 6th magnitude. For those stars in the southern hemisphere, outside the field of the northern telescope, he had another instrument constructed - in this case a reflecting telescope - with a suitable spectrograph. This outfit was shipped to Chile and mounted on a low mountain near Santiago, - all with the generous assistance of Mr. Mills.

Thus Campbell was carrying out his big undertaking. It was begun in 1896, and in 1907 was being brought to a successful conclusion. By combining all the stellar velocities he had secured a new and authoritative value for the solar apex, i.e., the point in the sky towards which our sun and its system is moving, and the velocity at which it is travelling through space.

The 36-inch telescope was also being used in a systematic survey of the sky for double stars. This was entered upon in 1899 by R.G. Aitken and W.J. Hussey. The latter left the observatory in 1905 and Aitken carried on the work alone, completing it in 1909.

Another fundamental instrument was the meridian circle. In the older observatories this was usually the most important instrument in their equipment, its object being to determine the precise positions of the stars in the sky. That at the Lick Observatory was made by Repsold in Germany, and it was said to be one of the best in the world. It was in charge of R.H. Tucker.

A part of the original equipment was a 12-inch refractor of superior quality, which was used for observing planets, comets, and other objects in the sky.

I was anxious to learn how to use these instruments, and wished to make observations and reduce them in the most approved way.

#### Astronomical Phenomena in 1907

There were several astronomical phenomena which were predicted for the summer of 1907 which I looked forward to observing; also, I hoped some unexpected object might appear in the sky.



Mars was to be in opposition to the sun on July 6 and nearest to the earth on July 13, which time it would be 37,800,000 miles distant. As the planet at opposition, on the average, is about 48,000,000 miles from the earth and never at any opposition comes within 34,000,000 miles, it will be seen that the 1907 opposition was a very favourable one. These near oppositions occur every 15 or 17 years. The last one had been in 1892, and the one before that in 1877, at which time the two tiny moons of Mars were discovered with the 26-inch refractor of the Naval Observatory in Washington, the largest refractor in existence at the time. The next close opposition after 1907 was on August 22, 1924, and the distance from the earth, the least in many years, in the past or in the future, was 34,637,400 miles.

The rings of Saturn in 1907 were to be turned edgewise to the earth, at which time they would be invisible - at least in a small telescope. I was anxious to try them in a large one.

Further, the satellites of Uranus (4 known then, one discovered since) which are very faint objects, were to be peculiarly placed with respect to the earth and well worth observing.

Just four days after my arrival at the observatory a telegram was received announcing the discovery of a comet (1907d) by Daniel at Princeton. Here was an unexpected object such as I had hoped to see! It was visible to the naked eye for a month.

#### Clock Comparison

One of the important duties of the astronomer is to keep accurate time, and to assist in doing this the Lick Observatory possessed six fine clocks, the newest one being by Riefler of Munich. In it the works were enclosed in an air-tight glass cylinder in which the air was kept at constant pressure. Of course the "leading" clock was checked periodically by observations of the motions of the stars: that was done by Mr. Tucker. But accurate time was required every day in the work of the observatory, which included the sending out of signals each day to the western part of the United States. So for security the "leading" clock was compared on six days of the week with the other five.

This was done by allowing the clocks being compared to write their time-readings simultaneously on a revolving drum known as a chronograph. The observatory had two high-class chronographs. Just then this was in charge of R.F. Sanford, one of the young astronomers, who was on a two-weeks vacation, and Mr. Tucker suggested that I substitute for him. The large number of clocks made the separation of the signals confusing at first, but before



Sanford's return I was able to carry out the comparisons with moderate speed and certainty.

### Velocity in line of sight, or Radial Velocity

The measurement of the velocity of a star in the line joining the star to the observer is a different kind of problem. The actual spectrogram, i.e., the photograph of the spectrum of the star, used in the operation, was taken with the 36-inch telescope. The photographic plate was about 2 x 3 inches, and the spectrum was a narrow strip perhaps  $1/16$  inch wide and 2 inches long, which under a microscope appeared to contain a series of short parallel transverse lines. On each side of the narrow strip obtained from the star was a parallel narrow strip obtained from iron vapour produced by an electric spark at the spectrograph. These spectra of iron vapour, which consisted of lines in definite fixed positions on the plate, were called the comparison spectrum and were used to determine the precise positions of the lines in the spectrum of the star. If the star was at rest with respect to the observer, its stellar lines would be in a definite position; if the star was moving towards the observer, its lines would be displaced towards the blue end of the spectrum; and if it was moving away from the observer, they would be displaced towards the red end of the spectrum. From the amount of the displacement the velocity could be computed.

The actual displacement on the plate was usually of the order of a ten-thousandth of an inch, and so it will be seen that the whole performance of adjustment, focussing, exposure, development, measuring and computing must be done with extreme care or the final result will not be trustworthy.

In the early days of radial-velocity measurements the estimation of displacement of the lines was made by eye-observations at the eyepiece of the spectroscope and the different results obtained for a star by an astronomer varied amongst themselves more than the true velocity. For example Huggins in 1868 gave the velocity of Sirius as 29 miles per second of recession; the modern value is 4.5 of approach. Before the application of photography in 1888 the different values obtained for a star might vary as much as 100 miles per second.

When I was at the observatory about half a dozen men were regularly assisting in Campbell's programme - Campbell, Wright, Moore, Burns, Curtis, Albrecht, and others - and most of them became distinguished astronomers; and Campbell told me that he was very proud of the men who had been trained in radial velocity work at the Lick Observatory and were competent to take charge of any observatory in the land. W.H. Wright and J.H. Moore each actually became director of the Lick Observatory. Dr. R.K. Young, who joined me at Toronto



and who had an important part in designing the 74-inch reflector of the David Dunlap Observatory and its unexcelled spectrograph, was a graduate student at the Lick Observatory for three years, 1909-12.

I read up all the available literature on this subject, made the actual exposures, developed the plates, measured them and made the actual computations. I also prepared the required tables (different for each spectrograph) and tried to do every part of the process of securing the final results. I wished to utilize what I had learned in my course of lectures on Astrophysics at the University of Toronto.

As to Dr. Aitken's double-star measurements, there were not so many details to learn. With his guidance I looked at many doubles, using powers as high as 2600x; but one needed practice and time to follow up the observations, as well as great patience and devotion to the work.

Mr. Tucker's great instrument had even more restricted use, but I took part in the observations and learned the significance of the many corrections in his work.

#### Seeing things - Mars

Along with Blair I had my first view of the planet Mars in the 12-inch telescope at 3.30 a.m. on June 20. The S-pole cap was easily visible, and also a dark area below it which I took to be Syrtis Major, but the seeing was not very good and I could not be certain. On the 28th and 29th we observed it again but the views were much the same. However on the night of June 30-July 1 we observed from 11 p.m. to 3.20 a.m. and had excellent views. The most striking feature to me in these observations was the decided change in the surface markings which took place during the  $3\frac{1}{2}$  hours we were observing it. This was of course due to the rotation of the planet on its axis which it completes in 24 h. 37 m., i.e., a day on Mars is 37 m. longer than one on the earth.

The two moons of Mars were not discovered until 1877 when Asaph Hall had the use of the 26-inch telescope of the U.S. Naval Observatory, then recently constructed and the largest in existence. I was anxious to find out if I could detect them with the 12-inch. It is much easier to see an object after it has been discovered and you know it is there. On July 3 Aitken turned the 36-inch telescope on Mars, and by occulting the bright ball of the planet by a bar across the eyepiece, I saw the two moons plainly. We used powers of 350 and 500, but the former was the more satisfactory. The planet itself was no better than in the 12-inch.



On July 9 I tried with the 12-inch for the moons again by occulting the planet by means of a drop of India ink which I had put on the field lens of the eyepiece. I would turn the telescope until the ink-spot covered the bright image of the planet and then carefully search around it. I could see what I took to be the outer satellite Deimos, but not the inner one Phobos. On March 12, after seeing the satellites in the 36-inch I searched with the 12-inch. I got the outer one easily but was not sure of the inner one. I then determined from the Ephemeris when the inner satellite would have an eastern elongation (i.e., be apparently farthest to the east from the planet), and at 12 o'clock midnight July 15 I searched again with the 12-inch. This time I was successful, I saw the satellite clearly.

On this same date I sketched the surface of the planet. Upon it were two straight narrow lines which might be called 'canals'. They were in the Sabaeus Sinus region. I got one or two others on several other occasions (July 5, July 9, July 25) but on July 30 I looked carefully in the Solis Locus region where they are most often seen, but could not detect any. However the seeing was not very good. On Aug. 4 and 5 I had good views of Mars the 12-inch with power 300 but saw no canals.

#### Saturn - Disappearance of the Ring

As every person knows, the planet Saturn possesses a remarkable ring, really a set of rings, which give it a distinction above the others. This ring is inclined at  $27^{\circ}$  to the plane of the planet's orbit and it is always parallel to itself. Consequently during the planet's revolution about the sun in  $29\frac{1}{2}$  years the ring appears to open out to widest extent twice and midway between these epochs it narrows down to a straight line which cannot be seen in a small telescope.

The precise conditions for the ring to be invisible are: (1) when the earth is in the plane of the ring, (2) when the sun is in the plane of the ring, and (3) when the sun is on one side of the ring and the earth is on the other. All these conditions would occur in the summer of 1907.

On June 20 the earth and the sun were on opposite sides of the ring but I could see it plainly with the 12-inch telescope. It appeared as a straight line across the disk of planet and extending beyond it. On July 1 and 12 the appearance was the same. On July 20 I could see the line across the disk but not beyond it; but the seeing was poor. With the 36-inch, on the morning of July 26, Aitken, Campbell, Julius of Utrecht, Albrecht and I



distinctly saw the ring. At this time the sun was in its plane and the earth was  $2^{\circ}$  above it. Campbell said he saw the ring beyond the ball of the planet thicker just near the ball and tapering to its extremities. I observed it in the 12-inch at 12.45 a.m. July 25 and could see the ring with power 150, seeing not good. On July 31 the ring was very plain.

The conclusion was that the ring when turned edgewise to the observer was still visible in the 12-inch telescope.

### Uranus

The planet Uranus revolves about the sun at a distance of almost 1800 million miles in a period of 84 miles and the plane of its orbit almost coincides with that of the earth, that is, the ecliptic plane. Its satellites are very faint, requiring a large telescope to see them. An outstanding peculiarity of these satellites is that the plane in which they revolve is almost at right angles to the orbital plane. Consequently, twice in the course of a revolution of the planet the earth will be approximately in the plane in which the satellites move and they will be seen arranged in a straight line; but midway between these two epochs the plane of the satellites will be at right angles to the line drawn from the earth to Uranus and the satellites will appear to describe (approximate) circles.

At 1.30 a.m. July 4 Aitken turned the 36-inch telescope on Uranus, and we saw clearly Uranus and his well known four moons. Ariel was in direction 9 o'clock with respect to Uranus, Umbriel at 4.30, Titania at 8 and Oberon at 3. Aitken made micrometer measurements of the satellites relative to each other and then of one of them to the planet; and I recorded for him. These measurements were intended to be used in checking the computed orbits of the satellites.

### Daniel's Comet

At 2.45 a.m. June 16 I joined Aitken in the 12-inch dome and he turned the telescope on the comet, which at that date was easily visible in the finder. Aitken called off the times and the micrometer measures which I recorded. The times were from a chronometer beside him. Then we went up to his room and worked out the apparent place of the comet in the sky at the time of observation and its direction of motion. A telegraphic message was then composed giving the details of the observation and filed for despatch in the morning to Harvard Observatory whence it was distributed to the observatories of the world.

At 12.30 a.m. July 14 I met the Director and helped him to remove the Mills 3-prism



spectrograph from the 36-inch telescope and attach in its place the 11-prism spectrograph in order to photograph the spectrum of Daniel's comet. All was ready at 1.15, but the comet was too faint for our purpose. However we examined it visually and saw the usual three hydro-carbon bands, as well as the continuous spectrum from the nucleus. On July 28 we tried again and were successful this time. The spectrogram obtained was used by Campbell in a short paper on the spectrum of the comet. On August 11 we made an exposure from 0.22 to 1.40 a.m. on the comet's tail but got no spectrum.

In the early morning of July 16 I went with Duncan to the Crocker telescope to photograph the comet. We got things going at 1.30 and all proceeded well for 37 minutes, when the clock cord snapped and could not be repaired at the time. We developed the plate but it was somewhat underexposed. Then I went to the 36-inch dome and helped Albrecht who was having difficulty in turning the dome. It had "stuck". I "crow-barred" the gearing of the water-engine and we finally got it to go.

#### Twilight Arc: Zodiacal Light

Before going to Mount Hamilton I had never seen the Zodiacal Light and I was not aware of the Twilight Arc, but there they were familiar objects. On July 15 the Zodiacal Light seen in the east extended over almost  $90^{\circ}$  of arc, - up to the Pleiades. I noted also on many days contortions of the sun just before setting and made some sketches. I learned that in 1893 these odd shapes had been photographed at the observatory by A.L. Colton.

The fog as it moved up San Francisco Bay was also a pleasing spectacle. Some beautiful pictures were obtained as one looked down upon the upper surface of the clouds.

July 2 was cloudy much of the day and in the afternoon a little rain fell, nearly enough to lay the dust on the road. That evening when I was in the 12-inch dome looking at Mars drops again fell. I was informed that this was almost a record for July on Mount Hamilton.

#### Visitors to the Observatory

A pleasing feature of the observatory was the attention given to visitors. Usually there would be several persons on the regular daily stage who wished to see the famous institution. There were always some members of the staff at the front door as it came in, and the visitors would be shown about the place in the hour that the stage waited. They were always pleased with what they saw and learned, as well as delighted with the 26-mile drive up and down including the hair-pin turns. On Saturday evenings visitors were permitted to



view objects in the heavens with the 36-inch and 12-inch telescopes, and special carriages were provided at San Jose for these occasions.

On Friday, June 14, some 90 graduating students from the state normal school at San Jose arrived about 3 p.m. in six four-in-hand carriages and three 2-horse ones. They seemed rather maturer than our Ontario girls just starting to teach. I put them down as 21 or 22 years old, the average for graduating B.A.'s at the U. of T. They remained on the summit until about 9 to 10 p.m. The last ones to leave would not get back to San Jose before 2 a.m.

Next day was Saturday and about 65 more visitors were on hand at night, 40 of them being additional normallites. Wright was on duty with the 36-inch and Aitken with the 12-inch.

On the evening of June 22, three days before full moon, a large crowd gathered to peep through the telescopes. There were two automobiles and numerous horse-drawn carriages. Perrine had the 36-inch trained on a crater on the moon near its S-pole, using power 270, the lowest possible with the telescope, the focal length of which is 56 ft. 2 in.; Aitken (epsilon) had the 12-inch turned to E Lyrae. In the visitors' book over two pages of names were entered on that date.

On the evening of June 29 about 75 had assembled. Wright showed the Cluster in Hercules with the 36-inch and Newkirk showed E Lyrae with the 12-inch. The Director, Blair, and Burns had "personally-conducted parties".

On July 20 there were fully 100 visitors - in automobiles, stages, and very miscellaneous carriages. Perrine showed the moon in the 36-inch and Fath Mars in the 12-inch.

The next Saturday, July 27, was a notable occasion. There were about 110 visitors at night. Among them were Fath's "a Virginis", Miss Peterson, (who attended Carleton College with him and was now a teacher in Dakota), Newkirk's "best" and her mother, and two friends of Miss Hobe of the staff (the Misses Kimball). It was 11 o'clock before the dome was cleared.

On Saturday, Aug. 3, Professor and Mrs. Simon Newcomb came to the observatory for a week's visit. Prof. Newcomb had just completed a course of lectures on "Least Squares" at the University at Berkeley. It will be remembered that it was he who went to Europe and contracted for the casting in Belgium of the disks of glass for the great telescope, and he arranged also for the grinding of them to form the 36-inch lens, at Cambridgeport, Mass. He was among the "visitors" during the evening. On Tuesday, Aug. 6, the Newcombs



had dinner with us at the Senior Mess and we enjoyed their company. Newcomb was inclined to be reticent and Mrs. Newcomb apologized for him and well made up for what he lacked. During the day Newcomb would generally be found reading in the library. On account of his being reserved we hesitated to approach him, but when I asked if I might take a photograph of him he was very agreeable and I got two excellent films. On Aug. 8 I was with Moore in the dome when Mrs. Campbell and Mrs. Newcomb came in. We removed the spectrograph in order to allow the ladies to see Mars and the Cluster in Hercules with the 36-inch. On Sat., August 10, Professor and Mrs. Newcomb left at 2 p.m. We all gathered to bid them good-bye and Professor Newcomb completely unbent and addressed a few words to us. He apologized for any appearance of stiffness, assured us he had greatly enjoyed his visit and invited us to call on him in Washington. He died in 1909. I may remark that Newcomb was born in 1835 in Wallage, Nova Scotia.

On June 22 Alexander G. McAdie, chief of the U.S. Weather Bureau for California and Nevada, was a visitor at Dr. Campbell's and I was happy to form his acquaintance. We had a special bond of interest. He informed me that he was the first graduate student at the Jefferson Physical Laboratory, which was opened in 1884; while I was there for the session 1900-01. McAdie died Nov. 6, 1943, aged 80.

On Tuesday, August 6, a distinguished party of R.C. priests came to the observatory in two automobiles, and I was allowed to secure a photograph of them. They were: Archbishop Patrick W. Riordan of San Francisco; H.E. Bishop Silva, Uncle of the King of Portugal; the following from the San Francisco Cathedral, Thos. O'Malley, S.J., Thos. McKeough, S.J.; Sasia, S.J., Ram, S.J.; and J.A. Lally of San Jose.

On Wed. evening, Aug. 14, Mrs. Phoebe Hearst, her son W.R. and wife, and two other ladies came to the summit and the Director showed them objects in the sky through the 36-inch telescope. I had the pleasure of assisting in the dome and met the visitors. They all left at daybreak next day, going to San Francisco by automobile. Mrs. Hearst, by the way, had presented one of her automobiles to Dr. Campbell. She was widely held in high esteem.

I shall mention two more visitors. John C. Duncan arrived with his young wife on July 2 to assume the position of Fellow. He became well known as professor of astronomy and director of the Whitin Observatory at Wellesley College, and for his remarkable photographs of nebulae taken with the 100-inch telescope at Mount Wilson. On July 15 Arthur B. Turner, professor of mathematics in the College of the City of New York arrived. He had



been at the observatory before this and had begun an investigation into the orbit of the binary star w Draconis, which he finished on this visit - on August 22. I was pleased to add him to my list of valued Quaker friends.

#### Leaving the Observatory: Two expeditions

The summer passed quickly, and the men of the Senior Mess decided that before my departure we should have two camping trips together, among the mountain ridges and valleys.

On Saturday, Aug. 17 at 2 p.m. Turner, Albrecht, Sanford and I started down the "12-inch" ridge and, after a steep and rough passage, reached the Trout stream and then the swimming pool where it joins the Ysabel. After a fine swim we continued along the Ysabel to the bridge and then the road to "old man" Harney's, - one of the denizens of the wild country, known to all the "fellows". Tucker had gone ahead on his white horse and met us here; and our blankets and some eatables had been sent ahead by wagon. After cooking some green corn and making coffee we ate "dinner", and after this we had a talk-fest at Harney's. Dusk was near at hand and we went to bed on the ground. Turner and I lay under the same blanket. We watched the stars for a long time. I made out E Lyrae double and saw nine stars in the Pleiades. After many jokes and occasional visits by pigs and a horse we got to sleep.

We were up before the sun rose over the hills, and after a breakfast of eggs and sausages we got on the move. Turner and Sanford went back to the Ysabel to try a fish with fly. Tucker, Albrecht and I went the other way. Leaving Harney's at 6.15, we reached Knoblauch's about 7, and went on up Mount Day nearly to the summit, but halted at 9 o'clock on a rocky bluff overlooking the valley and San Francisco Bay. We ate lunch (as the schoolboy eats his lunch at recess), read from a book which R.H.T. had brought, and then at 11 began to return. We took a route along the east face of the mountain and after difficult and hot climbing we reached Aikens' place. Here, up in the hills he lived alone. He went to San Jose once a month. He had some small fields on the face of the hills, and in his garden were peaches, prunes and figs. There was a beautiful spring on his premises. After a half-hour's talk we started forward on a fair road. We got to Harney's again at 1 o'clock and the bridge at 1.30. Here we waited for the rest of the party. At about 5 we reached 'Jim' Harney's where we had a refreshing drink. At Smith's cabin we halted until the sun had dropped low, and then at 6.07 we started up the hill. We reached the top at 7.30. Everybody was tired, but after a bath and something to eat we went to bed and had a fine rest. I believe I walked 15 miles in the hot sun that day. All the country was new to me and very interesting.



### The San Antonio Valley

On the next week-end we went eastward to the San Antonio valley. Ernest Gerber, one of the residents out that way, came to the observatory at 11 a.m., Sat. Aug. 24. Turner and I rode with him in his light wagon with mule team, Tucker rode his own white horse all the way, and Albrecht and Sanford alternated between riding on a horse Gerber had led over, and sitting in the wagon. Quite a cavalcade! At 2 o'clock we started. At the Ysabel, near Bass's ranch, the wagon halted for the horsemen, and while there we exercised ourselves with a base-ball. Then we went on, and reached Gerber's place at 6 p.m. The road was very interesting. To the Ysabel, over Mount Hamilton, it wound about in all directions; and in the valley we passed along creek beds and through the Saw-took Canyon where we got out of the wagon and walked.

Upon arriving we proceeded to prepare for night and Tucker made fire for supper. We had green corn again and it was quite dark before we got through. The moon came up at about 8.30 and we went to bed. I had borrowed an observatory sleeping bag and with the clothes from my bed I was quite comfortable. It was quite cold during the night but we did not suffer.

Up before sunrise (Sunday morning). Breakfast at 5 and at 6.15 on the tramp. We all went west towards Red Mountain. Tucker and Sanford had rifles but saw nothing. We wound up the mountain and over to see the Mercury Mine (then not in operation). Then up towards the summit. Sanford, Albrecht and I went to the top; Tucker and Turner turned off and went down to Fowler's. We reached the top about 10 o'clock and ate lunch there. Then we walked along the top of the ridge to the Magnesite Mine, from which the mineral was being brought out by a telpherage system - buckets carried along wires strung on poles. I believe the magnesite was used in the manufacture of soda water. I brought a sample home, and have it still (1950). Then we descended to Fowler's and met Tucker and Turner. After a rest we went on and reached camp at 3 o'clock. A fine tramp!

After dinner we went to call at the ranch house but no one was at home; and we went to bed. It was cool again and in the morning there was a coating of ice on Albrecht's sleeping bag. We got up at 4.30, had breakfast at 5 and started out at 6 a.m. We took another road with the wagon, a most interesting one over the chaparral mountain, where we had to walk, and much of the way Sanford, Albrecht, Gerber and I eased the journey by singing. Home on the summit at 11 o'clock Monday.

The trip to San Antonio was the best I ever had.



Leaving the Mountain

On Thursday, Aug. 15, at my suggestion, a group photograph of the staff was taken at the main entrance to the observatory. I felt honoured to be included in it, and, with the autographs beneath it, it recalls one of the happiest and most valuable experiences in my life.

I took many photographs on the summit and made many prints from negatives in the possession of the observatory. I packed my trunk and suitcase on the morning of August 27 and Albrecht helped me to carry the former over to the landing. It weighed 150 lb., the same as myself. Its transportation down the mountain was \$1.50; mine, \$1.25.

I said good-bye and the stage left at 2.30. There were ten passengers, among them Turner and myself. The road was good, the weather fine. It was a delightful trip down. San Jose was reached at 6.15 p.m.

## 3. TO MOUNT WILSON AND THEN HOME

I was on the way home, but I did not take the shortest route. My ticket read: Toronto to Los Angeles and Return. I wished to see Mount Wilson and consult George E. Hale there before I should start eastward.

Visit to Mount Wilson

So, along with Turner, I left San Jose on Wednesday, August 28, at 9.35 a.m. on "The Coaster". The route at first was along fine valleys; then we passed through several tunnels and got to the ocean shore, where we were impressed afresh by the eternal waves rolling in. We decided to stop over at Santa Barbara (320 miles) which was reached at 7.40 p.m. We put up at a hotel near the station, and after supper inspected the town, including the magnificent Potter Hotel on the shore.

Next morning we visited the noted Mission which was established in 1786 and which through continuous attention was still in excellent condition. We were conducted about it by a monk wearing sandals. The walls were almost six feet thick; and the historic tower, chapel and parlors were worth seeing. We went to Oak Park, an open space full of weeds with a notice that cows must not be allowed to run in it! Lunch at Casa de Brabo, our neatest meal yet, is worth a comment. There was rather too much olive oil and onion but everything was cooked perfectly and served daintily!

We left at 3.05 for Los Angeles (103 miles). For a considerable time the road went in and out, following the coast, with water near us on our right. Then at Montalvo we turned



inwards and reached Los Angeles, after a pleasant trip.

Next morning we looked about the town and were favourably impressed. Its population then was quite modest, that for 1910 being listed at 319,000 while for Toronto it was 424,000. Then I went to Pasadena and called at the Mount Wilson Observatory office. G.W. Ritchey was there and he showed me the place. The workmen (about twenty) were off on a holiday and the shops were very quiet. Hale was up on the mountain and so I arranged to go to the top.

By telephone a burro was obtained for me to ride up. At 1.30 I took a street car and was able to get within one-quarter of a mile of the foot of the mountain, and I began the ride at 2.15. The road or trail was a very steep and narrow one and I thought it would never end! I was not given a whip or goad of any sort and kicks with my heels did not hasten the little beast at all. But I stayed with it and reached the top at 6.20.

On the way I had to meet several mules which were on the down trip, and just before reaching me they always made a rush forward. Twice I was nearly pulled off my animal. At one place I met a woman on a burro with a man walking just behind. I stopped, but he said, All right! The trail was very narrow and our animals rubbed sides. I hurriedly jerked my foot out of the stirrup, but it struck her leg and hurt her, though not seriously. She shrieked, and 'he' asked, "Are you hurt, Isabel?" "Yes, I am!" she shouted. However we both went on.

On reaching the top I gave up the burro, went to the hotel, cleaned up and had supper. Then I telephoned to Hale who said I was to go over to the observatory. I started out and Ellerman met me on the way. At the Hermitage (the living quarters of the observers) were: Hale, Julius, St. John (who was just joining the staff), Olmsted and Ellerman.

I discussed matters with Hale. Now by this date I had hope of securing an 18-inch refractor for Toronto; and he said much good work could be done with such an instrument in observing accurately the forms of the spots and prominences of the sun. He gave me also some very useful information regarding spectroscopes and other equipment. Then we all left the room. The others went to bed, but Hale took me up to his Laboratory and showed me his outfit. I got to bed at 10.45.

Next morning (Sat. Aug. 31) I got up at 5 o'clock. Hale, St. John and Julius left at 5.30 to walk down the mountain trail. Along with Ellerman, I watched the sun come up over the mountain to the east. The fog filled the valleys and I tried <sup>a</sup> to photograph of it -



not very successful. At 6.20 Ellerman began his daily photographing of the sun. First he took a direct exposure. Then he took spectroheliograph pictures with Ca, Fe and Hy; and lastly a series of plates of the spot after the bright disc surrounding it had been reduced in intensity to that of the spot.

Then I had breakfast with Ellerman and Olmsted at the Hermitage, and after that I set out to photograph the summit. But the fog had risen and it prevented everything but pictures of some of the buildings.

I learned that Hale expected to have his (first) vertical telescope ready in ten days. The tower was 60 feet high and the well 35 feet deep. The cost was \$18,000.

At 9.35 I started down. I had paid \$1 for a burro, but decided to go afoot as it was much quicker. Olmsted had a wife and two boys in Pasadena, and had started down at 9.25. I had missed connecting with him and so started down at good speed. The morning being foggy it was pleasantly cool and I went  $4\frac{1}{2}$  miles in 55 minutes. Soon after this I overtook Olmsted who was taking it easy as he had found he could not catch the 11.10 car. We went down surely and I made the whole distance in 2 h. 10 m. I learned that he had gone up in 2 h. 10 m. and Adams in 2 h. 6 m. We caught the 12.10 car and reached the middle of the city at 12.40. After lunch on Colorado St. I went to Los Angeles via Wentworth St. and found my trusty friend Turner awaiting me.

We then went by electric railway to Redondo beach, 21 miles, and came back at 6 o'clock. After dinner we searched for souvenirs, not very successfully, and then to bed at 10.30.

I was up at 7 a.m. (Sunday, Sept. 1) and after breakfast (as usual) at McKee's, went to secure my sleeping-car ticket. Then Turner and I took a belt-line trip which went through the oil region. It seemed incongruous to have a dirty derrick on the front lawn of a good dwelling house, but no doubt the owner considered the "black gold" being pumped up continually a satisfactory return.

Then we went to hear Robert J. Burdette preach in the famous Auditorium. Burdette had a reputation as a humorist attained, I believe, chiefly by his writings in the "Burlington Hawkeye". I had heard him 'lecture' to a large audience in Toronto on February 19, 1894, but he greatly disappointed them and many left the hall. But we wished to hear him after he had turned preacher. He had just come back from a holiday and the audience gave him a "handkerchief" reception. He preached on "Labour". His sermon was not a very logical discourse



but was much preferable to the hour of old "chestnuts" which he handed out in Toronto.

In the afternoon my friend and I walked to the oil region again and I got a photograph. I had taken one at Summerland showing the derricks pumping oil from under the ocean. These to me were wonderful scenes. Then we sat beside the palms opposite the Auditorium, and after supper I picked up my bag and we went to the S.P. station. We paraded the platform until 8 p.m. when we said good-bye, each hoping to see the other soon, - a pair of young lovers! Turner and I met quite regularly at meetings of the American Astronomical Society. He died Feb. 6, 1948, Age 75.

My berth was on the Sunset Express, in a back-number car which had to be used through a shortage due to an accident. I was in bed at ten o'clock, and when I wakened at 5.30 a.m. I heard the ocean rollers on the shore. I knew we should be away from the ocean long before this. We were over four hours late; a freight wreck near Hondo had held us up.

We were at San Luis Obispo (222 miles) at 8.12 a.m. (Mon. Sept. 2). Further repairs to the track delayed us another half-hour. We had two engines on and were pulled through tunnels and round horseshoe curves. The train did not make up much time, and after another accident to the engine and a wait of 15 minutes near San Jose we reached that town at 5 o'clock, over 5 hours late.

I had left my trunk at the Vendome stables while I should visit Mount Wilson. I soon located it and had it taken at once to the S.P. station, but I could not complete some other business as this was a holiday, - Labour Day. The town was full of excursionists, and the streets were decorated for Admission Day, September 9 (1850).

At 5.40 I boarded the train for Palo Alto (17 miles), the seat of the Leland Stanford, Jr., University, and arrived there at 6.20. I was much interested in this university which was opened in 1891. Before it was built the newspapers were full of information about it, and my friend Henry Rushton Fairclough, '83 U. of T., Lecturer in Greek at the U. of T., had gone in 1892 to be Professor of Greek there - I had other personal interest in it also. Fairclough retired in 1932 and died in 1938.

At the University Hotel, near the station, I had difficulty in securing accommodation. Early all of its 42 rooms were occupied, but at last I was given one "under the Eves". After dinner in the restaurant below I inquired the way to the University and to Fairclough's house. He was at home and we had a long talk. He expressed regret that I had not come earlier and had dinner with his family; and inquired carefully for Maurice Hutton, Ramsay



Wright, Alfred DeLury and others of the University of Toronto. He described the great damage done to the university buildings by the recent earthquake; and when I was leaving, Mr. & Mrs. Fairclough and the daughter, a girl of about 14, went with me and we walked about the university grounds. Then the ladies returned home and my friend accompanied me down the avenue of palms.

Stanford University certainly was planned on magnificent lines. It was said that the Senator and Mrs. Stanford paid a visit to President Eliot of Harvard University and in the interview expressed the wish to learn how much it would cost to duplicate in the west the great university in the east. I suspect however the wealthy pair knew something about other things than gold, and they certainly provided a noble monument to their son.

I was astonished at the amount of 'hammered' stone and mortar to be seen. That in the quadrangle, built while the Senator was living, was of exceptionally solid construction and withstood the earthquake well, but some of the later buildings, especially the library and the gymnasium, had suffered greatly. The University has had an honorable history and has brought credit to the United States. It is a pleasant incident in international affairs that the present (1950) head of that institution is a Canadian by birth and education. He is John Ewart Wallace Sterling, born in Linwood, Ont., in 1906; B.A., U. of T., 1927; Ph. D., Stanford, 1938; L.L.D., Tor., 1950.

Next morning I rose at 7, and after breakfast went up to Stanford again. I walked about the imposing place and took a roll of photographs. On the way back, to my great surprise, the rain began to fall, as it had during the night.

My train left at 9.31 and reached San Francisco at 10.40. At once I presented my ticket for validation, and went up to the ninth floor of the office to get a copy of "The Road of a Thousand Wonders". After an hour's wait I got my sleeping-car ticket, and I checked my trunk direct to Toronto. In the afternoon I took my suitcase over to Oakland and went by suburban railway to Berkeley, the university town. There I was pleased to see my friends, <sup>T. C. McKay</sup> ~~XXXXXXXXXXXX~~ (B.A. Dalh. '93, Instr. Cal. '04-'09), J.H. Macdonald '95, F.S. Wrinch '96; and to meet Professors A.O. Leuschner and R.T. Crawford. The former showed me the very effective Students' Observatory. Leuschner had a class in practical least squares, an hour lecture and a 3-hour laboratory period per week. I stayed some time at the Faculty Club and then went with Newkirk for dinner. After it he went with me to the station. I got back to Oakland Pier and into my car; and at 8.50 the train started. I sat



at the rear of the observation car for a long time as we sped along. I was definitely on my way home after my summer at the Lick Observatory. At last I went forward and climbed into "Upper 8, Car 1".

Up at 7 again next morning (Sept. 4). The road was very rough but the route up the Sacramento Valley very beautiful. At sparkling Shasta Springs, Cal., (296 miles) of course I drank the bubbling water. The train was 40 minutes late all day. At Ashland, Ore., (401 miles) there was much fruit for sale. The peaches, pears and plums were large and good-looking and the boys did a thriving business. Here we iced and watered- up the train and then went on. We passed along some extraordinary curves among the hills of Oregon. At one time I could see two tracks lower down on the mountain side over which we had passed in climbing to where we then were. There was a company of soldiers on the train, in charge of an officer in the berth below mine. They were in a "tourist" car and were bound for Bemerton Navy Yard on Puget Sound. I talked with a lady from Stockton who had come from Glengarry, Ontario, seventeen years earlier. She was going to "see" Portland and the Columbia River. Another traveller had been up Mount Hamilton and had been escorted around by Astronomer Burns. She spoke highly of the kind ~~of~~ treatment at the L.O. At dinner at my table was a woman from Los Angeles who said she could not ride backwards and I exchanged seats with her. She, her husband and two young children were on the way to Walla Walla - as I was, too. This world is a narrow place! We discussed Humorist Burndette's preaching in the Auditorium, which, I learned, was used for opera on ordinary nights.

#### Portland and Walla Walla

Portland was reached at 7.25 a.m. Sept. 5, on time! After breakfast I took a trip to Council Crest by electric car, but smoke in the air prevented a good view from that high point. When I got back I bought my ticket for Walla Walla (245 miles). I had a draft issued by the Canadian Bank of Commerce, and as there was a branch of that bank in Portland I presented it there for payment, and when I endorsed it and showed my long ticket, it was accepted. I asked for paper money, at which the teller expressed surprise and said they always paid in gold in Portland, - that I must surely come from Canada. He had a metal frame holding the different gold coins and I noticed that he paid them out expeditiously. However, he got me the paper money.

In the afternoon I went to Mount Tabor, and on my return I noticed a "Seeing Portland Car" and went for a 2-hour trip on it. The conductor was a very fluent talker with many



superlatives at his command. The population of Portland then, he said, was 180,000. It was the biggest city in the state and it had the biggest saw-mill in the world. We were also shown the Forestry Building of the Lewis and Clark Exhibition which was held in 1905. It was constructed of wonderful timbers. Some boards were  $7\frac{1}{2}$  feet wide.

Upon getting back to the centre of the city I went down to the water front on the Will-am-ette River (accent on am) and secured photographs of a stern-wheel steamboat and of the big saw-mill with its many smokestacks. I was told that at all times one could see foreign ships loading "deals", usually six inches thick, which they transported to Europe round Cape Horn; and that sometimes they brought European oak to be made into veneers, and took away pine and spruce deals.

After supper I went to the station. There was abundance of time, but I was nervous lest I should miss the train. At last we left Portland, and we reached Walla Walla soon after 5 a.m. By 6 I was dressed and the only 'hack' at the station took me to 615 Washington St., where lived my dear "Aunt Betsy". She was my father's sister Elizabeth who, sixty years before, married Isaac Parkes and settled in St. Catharines where they brought up a family of three sons and one daughter. The eldest son Elhanan was an apprentice to my father in the early '70's, and then he and his brother Joe had gone to the western states, to Nevada and California and then to Pendleton, Oregon. After this, "Haney" became a contractor in Walla Walla, a few miles away in Oregon, while Joe had an important municipal office in Pendleton. They had made good. The youngest son, Will, went to New York City about 1884. When the father died the two sons in the west urged their mother and sister Clara to join them there, which they did in 1889. Clara was a good singer and became a member of the Handel and Haydn Society. She married George H. Snell and they lived with her mother at the address given above.

I rang the door-bell and soon I heard my cousin's cheerful voice, - that she was coming. I had sent a post card from Los Angeles five days earlier stating when I should arrive, but it had not yet reached them. I received a great welcome. My Aunt and Cousin Clara were my particular friends and I had not seen them for nearly twenty years. When I attended the Collegiate Institute in St. Catharines in 1883 I lived next door to their house; ~~xxx~~ when I attended in 1887 I lived with them. I was a member of the family.

We had great talks together and walks about town. George Snell was a dealer in builders' supplies but I found he was a lover of books, and I specially pleased him by



presenting to him the two volumes in the Everyman series of Parkman's "Montcalm and Wolfe" which I brought to read on my journey. Cousin Joe with his two lovely daughters, Phyllis 19, and Effie 18, came up from Pendleton. We had a pleasant evening talking and the girls singing, while their father smoked endless "cigareets".

The next day we took a trip in the surrounding country which I found was flat and very productive, yielding much grain and fruit. There were many peaches but they had not the flavour of those grown in the Niagara belt. Haney gave us a drive about Walla Walla, and showed us the state penitentiary and also Fort Walla Walla, where there was a cavalry force, but much smaller than in early days. My cousin was not very enthusiastic about the West Pointers.

It was with much regret, and some tears, that I said good-bye when at 8.50 p.m. the hack drove up to take me to the station. We picked up two more passengers on the way. My train reached Portland at 8.15 next (Monday) morning, and I transferred to the Northern Pacific train <sup>which</sup> ~~which~~ left at 8.45. It was long and the country that we passed through was flat and uninteresting. The day was hot and dusty. We reached Seattle (183 miles) at 4.45 p.m. I went about town in the evening and was very favourably impressed. The way some of the hill had been levelled by high-pressure streams of water was wonderful. The city was picturesque and beautiful and appeared to be the seat of much commerce. I understood that its business expanded greatly when, ten years before this time, it became the great outfitting centre during the gold rush to the Yukon. At 1 a.m. I left for Victoria, B.C. (81 miles) on the "Princess Victoria". This was said to be the swiftest ship on the west coast, her speed being 21 knots.

#### ← Victoria and Vancouver

I did not know just the hour of my arrival but when I wakened at 6 a.m. we were at the dock. After breakfast I took an electric car to Esquimalt. I wished to see the famous naval and military dry dock. My interest in it had been quickened when I was in the Civil Service and audited some of the accounts of the department of Militia and Defence. I thought it a wonderful construction. Mr. Jephcott, the engineer in charge, conducted me about the place and explained every part of it to me.

Then I came back to the city and went to the Meteorological Office, which occupied the upper part of the Post Office building. It was in charge of E. Baynes Reed, an elderly but very active man. At the moment he was getting out the weather forecasts for the day,



but he soon finished and gave me a cordial welcome. He urged me to stop over and give them address on my Lick experiences, but I could not do so. R.F. Stupart, the director of the Meteorological Service came in. He was on a tour of inspection of the meteorological stations and had been a month away from his home in Toronto. We went up to the roof of the building to see the instruments, and later Mr. Reed took me to see the Milne seismograph.

Reed was much interested in the Royal Astronomical Society of Canada of which I was President for the four years 1904-07. He informed me that he had secured over twenty members for the Society and would have thirty before the end of the year. He introduced me to a surveyor named Stewart who proposed that the Handbook be made to include in convenient form all the astronomical data required in surveying and thus displace the almanacs used. I told him I heartily favoured this and had mentioned it to Dr. W.F. King and F.L. Blake. The proposal however was not adopted.

The Dominion Astrophysical Observatory at Victoria was opened for work in 1918. The Victoria Centre of the R.A.S.C. was organized in 1914, following a lecture by J.S. Platt.

I had lunch at "The Boomerang", and at 1 p.m. boarded the Charmer for Vancouver (84 miles). The ship was not a very good one and the crowd on board, particularly that part of it haunting the smoking room, was not very high class. There were about twenty Japs on the ship, going to Vancouver. Just before reaching port a big squall came up and rain was falling when we landed. First I went to the "St. Francis" (as Stupart had recommended) but the rooms were all taken. Next, to the "Commercial", and the same! Then I went to hunt the "Metropole", and on the street, in the rain, I asked a young man if he knew the way to it. He looked up, and "Dr. Chant!" he exclaimed. It was J.G. Davidson, (M.& P. '00, U. of T.), who had taught five years at Columbian College and then had spent two years at Berkeley, where he had just received the Ph. D. degree. He was now in charge of physics at the Royal Institute, the "McGill College in B.C." We found the Metropole and I got a room.

I had hoped to meet T.S.H. Shearmen and W.M. Carter in Vancouver, who were interested in organizing a Centre of the R.A.S.C. in Vancouver, but could not connect with them. Davidson was also interested in this. I was very pleased to meet him and he stayed with me until 10.30 p.m. Not until 1931 did the Vancouver Centre come into existence.

On the following morning I was called at 6, and at 6.20 I went down for breakfast, but none was forthcoming. They were repairing the range! At the C.P. station were Rev. R.J.



Wilson '00, and his charming wife, Mary Northway M. & P. '96. Her mother was on the train, returning to Toronto. The scenery along the line was pleasing, but I was informed that the finest views of the mountains would be passed during the night. It was suggested that I might get off in the evening at Sicamous Junction and take the next morning's train, but I felt I could not do that. The day was not very clear and I could not see the distant peaks plainly.

Next morning (Sept. 12) at 6 o'clock we were at Field (505 miles from Vancouver) far up in the mountains. The peaks towered up immediately behind the station and hotel. Just now they were covered with snow, as was also the ground, which is at an elevation of 4070 feet. At Laggan two or three inches of snow lay on the ground; at Banff (560 miles), about six inches and then it gradually decreased as we moved out into more open country.

The scenery until Laggan was grand, certainly the best yet. Beyond, near Hecor, I was pleased to see "The Great Divide", whence one stream flows westward to the Pacific and another eastward to Hudson Bay. At Summit the engine pushing behind and one of two pulling in front left us and we proceeded with the remaining one. The snow continued to fall so that the scenery could not be seen well. Soon the ruggedness ceased and gently rolling land took its place. The road along the Bow River was nearly level. At 12.35 we reached Calgary (642 miles) on time.

After lunch I was taken to see P.J. Thompson '96 U. of T., who was principal (I think) of the Normal School. While waiting in his room, A.M. Scott, M. & P. '96, Superintendent of schools for Calgary, came in. He was an old friend; had been an instructor in Physics at the U. of T. Thompson appeared, and after a brief conversation he asked me to go to a concert in the evening. So, after dinner with F.S. Selwood '97 (of Listowel), Thompson, Scott, a Mr. McKillichan and I went to the Methodist Church. The concert was of the 'elevated' type, being presented by the Y.M. Club Symphony Orchestra, an organization comprising about forty instruments, conducted by an Englishman named Howells. The programme was very creditably performed.

There were many U. of T. graduates in Calgary. One of the latest to arrive was E.L. Hill '88, late of Guelph, who had just come to be science master in the high school. Newcomb, late of McMaster, was also on its staff. During most of the day rain had fallen and the weather was cold and disagreeable. When packing my trunk on Mount Hamilton I put my overcoat in it, thinking I should not need it on the way home. Thompson took of his and



insisted that I should wear it.

My broth-in-law T.H. Whitelaw, B.A. '90, M.B. '93, lived in Edmonton, 192 miles to the north, and I had telegraphed that I would go to that city next day (Fri. Sept. 13). During the night there had been a heavy frost which did immense damage to the crops. (I believe the earliest date of a killing frost is Sept. 6). When I was paying my bill at the hotel the clerk somewhat wistfully referred to "Sunny Alberta". I boarded the train at 7.45 a.m. I noted that the country was mostly flat. Near Calgary there were no trees at all, but up near Edmonton there were poplars and some birch and willows. Some of the villages on the way were of quite respectable size and had electric light and other improvements. For the first 75 miles the ground was covered with snow and north of that considerable rain had fallen.

We reached the railway terminus at Strathcona at 4 p.m., where Whitelaw met me. The high-level bridge to carry the railway over the Saskatchewan River into Edmonton had not yet been built, and we had to take the but to that town. It was over black muddy roads, down a big hill and up a similar one, three miles in all. On the street we met George E. McCraney '93, M.P. for Ruthven, and after supper Whitelaw and I went over to the King Edward Hotel to see Mrs. McCraney. I also met Dr. McIntyre, M.P. for Strathcona, and Judge Horace Harvey, B.A. '86, LL.B. '88, an active friend of the U. of T. In the evening E.T. Bishop '99 and his wife Thyrsa Wooster M. & P. '99; and also George W. Robertson, M. & P. '07, called. We all had a pleasant talk. Robertson at the time was principal of Queen's Avenue P.S. but had been appointed to Strathcona High School.

Edmonton had many U. of T. graduates. In general they had "made good", and were serving the west in a distinguished way. I called on Daniel G. Revell, B.A. '94, M.B. '00, the capable provincial bacteriologist. His wife was Helen Rose Murray '95 and they had four little girls. In the evening (Sat. Sept. 14) Miss Bessie H. Nichols '97 and also James A. Fife '86, late of the Peterboro C.I., called to see me. Miss Nichols had been on the staff of Alberta College but was now a stenographer in a law firm and was also reading law. Later she became Mrs. J. Spratt. Fife was drawn to the west and was on the staff of the Edmonton . . . He was full of inquiries about University matters.

On Saturday night there was another heavy frost and the next day was still overcast and decidedly cool. I called to see the Bishop's twin babies, and went to see the historic



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old Hudson Bay Post. Then my brother-in-law and I went to the morning service in the Methodist Church. In it were memorial tablets to pioneers George MacDougall and George Hanna. It was the 'old' church and it was on a fine site, and it was proposed to replace it with a fine edifice. The preacher was Edson E. Marshall '94. He and his elder brother Sanford E. '92 were fellow students with me at the St. Catharines C.I.

AFTER the service I met Cecil E. Race M. & P. '97, on the staff of the University of Alberta, J.H. Riddell '90 (Vic.), principal of Wesley College, Mr. Marshall (the minister) and Miss Nichols again. It gave me great pleasure to meet my old friends and to make worthy new ones.

After dinner I packed my bag and at 3 o'clock the bus called to take me to the station, over the same awful road, down the hill and up again. The train left at 4 o'clock, in the midst of a snow storm. The ride to Calgary was uneventful, but the car was cool. At 11.45 we reached the city. My friend Thompson was there to meet me and I handed him back his overcoat which he had given up to keep me warm. He said two feet of snow had fallen at Macleod. I thanked him for his kindness and he said he was delighted with my visit. This loyalty of pupil to teacher warmed my heart!

### On to Regina

On looking out of the car window in the morning I discovered that we were on the level prairie. As far as I could see, not a tree in sight! Sometimes a seedy lake and occasionally a river with low banks. I went in for breakfast and took a single vacant chair at a table, and sat down beside T.L. Walker, professor of mineralogy, U. of T. Both of us were pleased. He was returning from a visit to Nelson, B.C., in search of specimens; had been away from home two weeks. For some time we sat in the smoking room where was a young Englishman who had been in B.C. for three or four years and was on his way back to England. Afterwards Walker lay on my sofa and I sat in the next seat and read "The Silent Places" by Stewart White. I stayed with it and finished it in the evening. It was a good story, full of Hudson's Bay Co. life and hardship, but not equal to "The Blazed Trail". The plot did not seem to me quite reasonable, and I thought White was weak in his treatment of women - and love affairs generally.

In the afternoon we passed beside numerous lakes on which many ducks were to be seen. In the morning the train was two hours late, but through waiting at crossings and continually



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adding fresh cars it was delayed further, until at night it was  $4\frac{1}{2}$  hours behind schedule. In Regina my class-mate Norman McMurchy '90 met me. I had written him that I would be passing through at 5.25 p.m., but it was nearly 11 p.m. McMurchy was teaching in the high school, of which Hector Lang, M. & P. '03, was principal. Who would be the next president of the U. of T., McMurchy said, was being actively discussed by the graduates of the U. of T. in Regina and James A. MacLean '92 was a favourite candidate. He was president of the University of Manitoba. R.A. Falconer was appointed to Toronto.

#### At Brandon and Souris

In the year 1907 my sister Rilla (Mrs. Donald Ross) lived a few miles from Souris, Man., and I did not wish to pass through that section of the province without calling to see her. So I wrote from Calgary that I should stop off at Brandon and take the branch line to Souris, 25 miles southward, and I asked that someone would meet me. At the same time I wrote to George Preston, the C.P.R. train despatcher at Brandon, to secure a room for me as I expected to reach Brandon during the night. George had been a public school pupil of mine and a friend ever since.

I got to Brandon at 6.45 a.m. and inquired for my friend. He was on vacation; but it so happened that I did not need a room. My branch line train did not leave until 1.20 p.m. What should I do in the meantime? I went to the nearby King Edward Hotel and had breakfast and then walked about the town, which pleased me very much. Then I remembered that one of my wife's intimate friends had married a Mr. Shirreff and had moved to Brandon. The two women still carried on an active correspondence. So I looked up the address of David Shirreff, who was manager for the Cockshutt Plow Co., and called <sup>on</sup> him. At once he knew who I was and telephoned to his wife. We walked to his house and while I talked with Mrs. Shirreff he hitched up his horse to the buggy, and we went for a long drive about the place and over to the Experimental Farm and the Indian Industrial School.

Brandon impressed me very favourably. The buildings, especially the schools, banks and business blocks, were very creditable. The streets were not so very wide - 66 feet I supposed - and so the place was not quite so stately as Edmonton and some other western towns. The population was about 7000, and photographs I took showed that there was abundance of breathing-space about the buildings.

The Brandon Experimental Farm was a charming place to visit. The general impression is that only one or two kinds of trees will grow on the prairie, but at the Farm there were



many varieties, although the prevailing ones were Manitoba maples, poplars and spruces. There were also beautiful flowers and hedges, also wild plums, raspberries, and I believe some apples, but the fruits were not very well represented. Mr. Shirreff had a crabapple tree which he showed me with considerable satisfaction. He pointed out the church buildings, which I thought very creditable, and the schools, of which he was a trustee. We also visited the Brandon (Baptist) College and Dr. McDiarmid, the principal, showed me all through the building. I thought it well adapted to its purpose, and I believe its record was excellent. I took a photograph of the town looking east from the College tower, which I still look at with pleasure. After this we drove to Mr. Shirreff's house at 1526 MacTavish St. where I took a photograph of my friends beside their home. Then Mr. Shirreff drove me to the hotel. It was a very happy experience.

At 1.20 I boarded the train and in an hour was at Souris, but no one was there to meet me! I inquired around the livery stables for people from the country and at last found a man (Mr. Iseler) who, on the way home, would go within four miles of my sister's place. Leaving my suitcase and umbrella behind, I climbed up beside him. He did not know just where Donald Ross lived, but at last he let me off, directing me to inquire at a house two miles farther on. I did so, and started off again to "go to the church and schoolhouse and then turn west and go a mile"; but before reaching the school a man in a buggy gave me a lift. He directed me to go on to the next trail (half a mile) and then make for a house he pointed out. I did so, but came to Will Ross's. I was directed again, and after calling at the threshing gang at this place, I went on about a mile and reached my destination. It was 6.45 and I had started walking at 4.45. I had gone six miles or more, two miles farther than necessary. The tramp was quite interesting. The country was level and covered with golden grain. One could see every building for miles around. There were no fences, and I walked in a straight line across the fields to the objects to which I had been directed. Donald and son Roy were helping to thresh at Will's, but all the rest were at home. My letter posted at Calgary had not been received, as they lived six miles from Elgin P.O., and this was the busy harvest season. We talked well into the night. The school teacher boarded with the family. He was a young Englishman named Rigby, from Manchester, and he had only four pupils, two of whom were Rilla's children!

Next morning the threshers were off early to assist at their neighbour's. My brother-in-law's farm contained 480 acres, three-quarters of a section. He had two binders, but at



times nine had been at work on it, the extra seven coming from his two brothers' farms. The frost which did so great injury in Alberta did no damage here.

After dinner Rilla and daughter Gussie hitched the 'driver' to the boggy and took me ten miles to Souris. There at 4.30 I bade them good-bye and left for Winnipeg, my ticket being honoured on this line in place of that from Brandon.

On the way I sat beside a man from Hamilton who, with another man, had been at Carman testing a "stocking" attachment to a binder. He said it was quite practicable and showed me two photographs of it. I never heard that it came into common use. I reached Winnipeg in three hours.

### Winnipeg and the Lake Trip

My first job next morning (Thur. Sept. 19) was to secure a sleeping-car berth to Fort William. Then I set out to see the city. Eaton's store was impressive, but it was not so extensive as the headquarters in Toronto, with which I was well acquainted. I went out to the Assiniboine River and then along Broadway where the government buildings were.

After that I went on Portage Avenue and walked across the bridge into the residential section. I took a photograph of the "University of Manitoba" building, situated within a fine campus, all around which potatoes were planted. Good for the soil, good for the population. I got also a picture of "Wesley College" on Portage Ave.

I went into the Legislative Assembly building, a very ordinary brick structure. The Dominion Trades and Labor Congress was in session there, and I listened to some of the speeches on the Lemieux Act. This comprehensive act, based on compulsory investigation, became the Canadian law in March 1907. It applied especially to mines, railways, steamships and other public utilities; but disputes in industry or trades could be brought within its provisions. It was considered a great advance in labor legislation. The Locomotive Engineers were opposed to the legislation but the Trackmen favoured it. The secretary of the Congress (Draper) made a powerful speech in support of the act. In the discussion little consideration was given to the needs and rights of the people as a whole.

The train from Edmonton came in at 5.40 p.m. and on it were my sister-in-law Mary Whitelaw and her young son, who were joining me for the trip to Toronto. They had been on the way since 4 a.m. We started forward at 6.50 p.m. and reached Fort William (419 miles) next morning at 9.30. After much shunting around we were taken to the wharf where lay the S.S. Alberta, and at 11.30 we started down the river into the great Lake Superior. We called



at Port Arthur (4 miles) where I secured a photograph of the wonderful new Canadian Northern elevator. The wind was moderately strong, and when we got past Thunder Cape and well out into the lake the waves were high and the ship had an annoying pitch and roll which few of the passengers could endure without nausea. There were few at the dinner table that evening.

After a long night I got up at 7 o'clock and found that the weather had moderated and the ship had very little unpleasant motion. On the previous day we had seen very little shipping, but this morning there was plenty of it. Most of it consisted of big freighters. At about 10.30 we reached Sault Ste. Marie and carefully looked through the old U.S. canal. At the same time two of the big ships, Empire City and its consort Sir Isaac Lowthian Bell, went through the new U.S. lock together. With their high bows they towered over one like mountains. The name of the consort interested me, and when, twenty years later, I read "The Letters of Gertrude Bell" I learned that she was the grand-daughter of Isaac Lowthian Bell, F.R.S., ironmaster and colliery owner in the county of Durham in England.

We steamed over to the Canadian dock but while going thither had to wait a while for Empire City and consort to get out of the way. They were moving very slowly while taking on supplies from a vessel alongside, thus making it unnecessary to go to a dock for the purpose. At the "Soo" we stopped three-quarters of an hour, long enough for us to walk up town, but we found nothing of special interest to us.

Then we went down the St. Mary River, which joins Lake Superior and Lake Huron. In many places the channel was narrow and the ships had to go slowly. In two places we passed big coaling stations. The route was very tortuous and rather pretty. Farms, houses and summer cottages dotted the shore. In the narrow channels we passed close to many ships, mostly of "high" degree.

We got out into Lake Huron about 4.30 p.m., and although the wind seemed quite as strong as on the previous day the ship had very little uncomfortable motion. Everyone seemed back to normal again.

A passenger on the ship was my friend John Warren Reid '83, one of the gold medal mathematicians in the Auditor General's Office in Ottawa. He was returning from a trip of inspection of posts of the R.N.W.M.P. in the west. He had seen much of the country, as the officers of the Force had driven him about each Post which he visited. This illustrated the means taken by the Office to clear up misunderstandings and 'tangles' occurring in the



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accounts of the Government Service. We had long talks at the bow of the boat, and I was interested to learn about changes in the Office since I had been in it sixteen years earlier.

Sunday, September 22. A day of sunshine and clouds. I got up at 6 o'clock and had breakfast at 6.50. We reached Owen Sound at 8.15 and at once transferred to the Express which left at 9.00.

The ride to Toronto was quite familiar to me from the time I was a teacher in the County of Grey. We slowed down to 8 or 10 miles an hour at the 'horseshoe' on the Caledon mountain, near Alton, where was still to be seen wreckage from the recent accident when an Exhibition excursion train left the rails and many people were killed. The Union station was reached at 1.05 p.m., and four members of the Laidlaw family were there to meet us. I reached my home at 2 o'clock and we were overjoyed to be all together again.

This was the end of a splendid trip in which I travelled over 8600 miles.

Finished Sept. 10/'50







XVI High School Physics; and otherText BooksGrowth of Teaching Physics

Very little science was taught at Markham High School when I was a student there--1879 - 82-- although, some provision was made for it in the Course of Study prescribed for high schools. At this school there were only two teachers and not all the subjects mentioned in the course were taught.

In the programme from the first year certain subjects were required of everyone, but several options amongst the others were allowed. A person could choose Latin, or French, or German, or Science which consisted of Physics and Botany. For Physics, the texts were two thin volumes, namely, Huxley's Science Primer and Balfour Stewart's Science Primer of Physics. In Botany, one was required to classify and examine some fifteen natural orders of plants.

In the second year these options were continued. The Physics consisted of the elements of Statics and Hydrostatics, the same as for Pass Matriculation into the University. I believe the text-books used were Elementary Statics by Thomas Kirkland, Science Master of the Toronto Normal School, and Elementary Hydrostatics by J. Hamblin Smith, an English writer of text books. Later I became personally acquainted with Mr. Kirkland, and I used several of Hamblin Smith's texts. Indeed, Hamblin Smith and Isaac Todhunter had almost a monopoly of mathematical texts up to the University, and the latter had several used in it. I have heard Todhunter's books criticised as dry and uninteresting, but I had no such fault to find with



them. There was a precision of treatment, a logical development of the subject, a gradual increase in difficulty in his sets of problems, which were hard enough, but not too difficult; also, we never detected a misprint or a mistake in the answers at the back of the book.

I passed the Intermediate Examination (similar to Pass Matriculation) in 1881, and the Honour Matriculation in 1883; and up to that time I had not studied science of any kind. Instead of it I had taken Latin, with added Greek in the last two years.

#### The Demand for Physics

But with the years there was an ever-increasing demand for the study of physics and that it should be taught by the experimental method, that is, the pupil should perform various experiments, observe what happened in each case, and record the result, being directed in his thought by carefully considered questions put to him. In this way he would be a sort of original discoverer of the laws of nature. It was remarked that for generations the pupil had been trained to read and remember what others had written instead of being trained to ascertain and establish, for himself, what was true. But equally it was insisted that the teacher of elementary science should constantly remember that the primary object of his labours was the training of the mind, the acquisition of information being a secondary consideration.

A definite step forward in Ontario was taken in 1885. Cortez Fessenden, principal of the Napanee High School, was



asked to prepare a text book on Elementary Physics for use in the high schools of Ontario. He examined many published text books, and the one which came nearest to his ideal of what such a book should be was "Elements of Physics" by A.P. Gage of Boston, Mass. With the consent of the author, Fessenden made this the basis of the book he prepared, which was published in 1888.

Fessenden retained, generally, Gage's experiments, which were mostly to be made by the pupil; but often where Gage gave a description of the phenomena which had been observed, Fessenden substituted questions to be answered by the pupil after he had made the required experiment. This seemed the ideal method to follow, but actual experience showed that it was not practicable, that the beginner was not able to give a final, clear-cut statement of the conclusion to be drawn from the experiment, but the teacher had to assist him to formulate the conclusions which he was attempting to determine.

#### Enter F.W.Merchant

The next important advance in the development of the teaching of physics in the secondary schools of the Province was due to Francis Walter Merchant, who was born at Oil Springs, Ont., Nov. 25, 1855. He received the B.A. degree at Albert College, Belleville, in 1878.

I may remark that in 1874, the Wesleyan Methodist Church, the Methodist New Connexion of Canada, and the Wesleyan Conferences of Eastern British America were united to form the Methodist Church of Canada; and in 1884, this body, the



Primitive Methodists, the Bible Christians and the Methodist Episcopal Church of Canada were all united under the name of The Methodist Church of Canada. The chief educational institution of the Methodist Episcopal Church was Albert College at Belleville, and it gave up its degree-conferring power in favour of Victoria College at Cobourg, which in 1890 became a federated College in the University of Toronto.

Merchant, early entered the teaching profession, and before his death on Jan. 29, 1937, he had occupied all the high positions in the Department of Education. Indeed new positions had been created in our educational system for him to fill.

In 1885, when I took a summer course in Art, offered to teachers by the Department of Education, Merchant was one of the instructors, his subject being Perspective. I believe he was then on the staff of the Ingersoll Collegiate Institute.

In 1895, when <sup>Fessenden</sup> Merchant was principal of the Collegiate Institute in Peterboro<sup>and Merchant what in London</sup>, there appeared the High School Physical Science, Part 1, of which these two men were joint authors. It was authorized by the Department of Education for Ontario and was published by Copp, Clark & Co. The book contained 220 pages.

The subjects taken up in it were:- measurement, matter, motion, force, energy and work; solids, liquids, gases; solutions, diffusion, occlusion; specific gravity; nature of heat, expansion through heat, temperature, change of state, measurement of heat, transmission of heat.

The treatment was by experiment throughout, but the pupil



was expected to answer many questions and solve many numerical problems. Also, the various principles and laws, deduced from the experiments, were stated with definiteness and precision. The book was not too easy for beginners.

On Feb<sup>ruary</sup> 29, 1896, I received from Merchant a note asking if I would read some printer's proofs of a text book on Physics; and on March 13, he came to see me. I had read the portion dealing with Sound and had noted a few "slips" which we discussed for several hours. He brought the portions dealing with Mechanics and Hydrostatics and left them for me to read. The former I thought rather difficult and not very attractive--indeed it is not easy to make it so.

I may remark here that Merchant called on Jan<sup>uary</sup> 30, 1897, to inquire about the course in Physics for students in Medicine which I had been giving for five years. It was intended to introduce such a course in the University of Western Ontario.

In the late summer of 1896, the book which Merchant had been preparing and of which I had read some 'proofs', was published. It was entitled High School Physical Science, Part 2. It contained 446 pages and was a fairly complete text book on Physics,--including Mechanics, Hydrostatics, Sound, Light, Electricity and Magnetism,--but no Heat as that subject had been treated at length in Part 1.

At this time Merchant was principal of the London Collegiate Institute. I remember that in 1896, Merchant was much interested in x-rays, which had just been discovered, and had acquired an expensive outfit to experiment on them.



In 1899 a Supplement to the High School Physical Science of 80 pages was published, containing the additional work in Mechanics which had recently been prescribed for Senior Leaving and Honour Matriculation examinations. At that time Merchant was principal of the recently established London Normal School.

In 1905 the Revised Edition of the High School Physical Science, Part 1 appeared. It had been revised to meet the requirements of the new curriculum and contained 339 pages. The revision consisted chiefly in the addition of parts dealing with Light and Electricity and Magnetism. It was designed to be used "For continuation classes in Public Schools and lower classes in High Schools." The senior author was now given as "F.W.Merchant, M.A., D.Paed., Principal, London Normal School". The degree of Doctor of Pedagogy had been conferred by the University of Toronto in 1903, and I do not think I am revealing any deep secret when I say that I had the responsibility of adjudicating the Thesis which was required in connection with the degree.

In 1906, Elementary Mechanics for Upper School Classes in High Schools by F.W.Merchant, M.A., D. Paed., Principal of the London Normal School, was published by the Copp, Clark Co. It contained 250 pages.

The work aimed to cover the course in Elementary Mechanics prescribed for the Upper School, which also included Hydrostatics. It combined an experimental with a mathematical treatment of the subject. There were 18 chapters and an abundance of numerical problems in its 41 exercises.



In 1910, the Curriculum for the Upper School was changed. To the Elementary Mechanics was added the treatment of the phenomena of Surface Tension and of the Flow of fluids. The phenomena specified were discussed very briefly, if at all, in most books on physics. Personally, I thought it was a mistake to add these subjects to the course which was already heavy enough. Moreover it had a certain completeness and was of the grade of difficulty appropriate for these senior students. Further, the Flow of Fluids is a branch of hydraulics and is not at all easy to treat in a brief and elementary way. But there were some showy and striking experiments to illustrate the phenomena referred to, while the experiments in Mechanics generally are not of the showy type but are nevertheless appreciated by the serious student.

During the summer of 1910, I was <sup>away</sup> from home and I did not return until Sept. 11. On my arrival I found an urgent request for me to get in touch with the Department of Education. There I was informed that many teachers of physics had written asking where they could find information on the new subjects which had been added to the Upper School course. After considerable searching I gave the Department a list of references which might be consulted. The most accessible of these was the Encyclopedia Britannica, 11th edition.

I was asked if I would prepare a supplement to Merchant's Elementary Mechanics (1906), dealing with the new subjects. To do this required considerable study and I got busy on it at once.



The supplement ran to 63 pages, with 55 diagrams, and was published early in 1912. In a new edition of the Elementary Mechanics it was included as the last two chapters. On the title page of this edition, Dr. Merchant's position was given as Director of Technical and Industrial Education for Ontario.

### Great Changes in the High Schools

From the above relation of events it will be realized,—

1. There had been a great change in the teaching of physics in the high schools of Ontario in the quarter-century beginning about 1885. There were many more pupils studying this subject and some excellent laboratories had been provided in which the pupils were given the opportunity of making experiments themselves, and thus learning how accurate information about the phenomena of nature can be obtained.
2. F.W.Merchant had a very important part in changing the nature of the secondary schools from the literary and classical to the scientific and industrial type.

### Pattern for Teaching Elementary Physics

In the course of the experience gained over these years the most satisfactory pattern for the teaching of elementary physics was evolved. It was (1) to have a text book with clear descriptions of the phenomena in the various branches of the science, and explanation of experiments which had been made in investigating the phenomena; and (2) a Manual, entirely separate from the text book, containing instructions for performing experiments in the laboratory with special apparatus provided for



the purpose.

### The High School Physics proposed

One evening in August 1908, a small boat came to the dock at my summer cottage at Go Home Bay. In it were Dr. Merchant and a friend. They had come into the Bay a couple of hours earlier in a smart two-masted boat which I did not recognize, and had anchored in a sheltered bay half-a-mile away (behind Brebner's cottage). They had rowed over to my place in the little dory which was always towed behind the bigger boat.

Dr. Merchant informed me that his vessel had been built to his specifications at Hamilton during the previous winter and that he used to go up <sup>from London</sup> to inspect it at week-ends. He and his companion, I understood, had brought it up by way of the Welland Canal and Lake Huron into the Georgian Bay, never travelling far from the shore. I was told by my friend J. C. Robertson, '83 U.C., that when Merchant and he were both teachers in Owen Sound the former had a "Mackinaw" which he used to sail on the wide waters there. He was now on his way to his summer cottage at Pointe au Baril, 60 miles further north up the coast. I was surprised at the knowledge Dr. Merchant had of the construction of a ship and the assurance he had in handling it. The trip from Go Home Bay to Pointe au Baril, among the 30,000 islands along the shore, is the most pleasing of its kind that I have ever taken, but I was always glad to have a competent navigator to pick out <sup>the</sup> ~~his~~ course.

The reason for Dr. Merchant's call was to ask me if I would collaborate with him in preparing a new text book on Physics to



be used in the high schools of Ontario. I was highly pleased with the proposal. The book would be published by Copp, Clark Co. We agreed to meet in Toronto at the publisher's office a month later when we should have returned to our regular duties.

In the morning I rowed over to <sup>Merchant's</sup> ~~the~~ little ship and thought it a very complete little cruiser. It was finished in oak and seemed cleverly planned and well built. While it had sails to utilize the breezes of the Georgian Bay and which gave it a picturesque appearance, it also had a small hard-coal-burning steam engine which could take the vessel to its port if the wind should fail.

The name of the ship was Iris (Rainbow), quite appropriate for a scientist, although Dr. Merchant was much more than that. He had a powerful mind, capable of analysing any question that came before him, and he had also a forceful character which carried him forward through any tasks he should undertake.

#### Arranging for the Publication

In September, Dr. Merchant and I met to discuss the proposed Ontario High School Physics in the office of Mr. H.L. Thompson, the president of the Copp, Clark Co. The office and warehouse of the company were then at 64 and 66 Front St. West, the manufactory being at 495 Wellington St. West. The former building was destroyed in the great water-front fire in 1913 and the offices were then moved to adjoin the factory, which was continually increasing in magnitude.

The president of the company had few conditions to lay down. He offered to supply us with any books which we thought



would be of assistance in our work. As a consequence we obtained many text books from the United States and Great Britain as well as some from Germany and France. These we examined carefully and they were very useful to us. We aimed to produce a text book as good as the best.

The royalty was to be ten <sup>✓</sup>per<sub>^</sub>cent. of the retail price of each book sold, to be shared equally by the authors.

### The Illustrations for the Book

Up to this time the illustrations in Canadian text books on physics had been mostly from wood engravings, which, if of good quality, were very expensive. In our book they were to be from zinc etchings which had been brought to a high state of efficiency. The drawing to be reproduced would be in india ink on white cardboard and by a photographic process this would be transferred to the prepared surface of a zinc plate which would then be etched with acid. After this had been completed the plate would be mounted on a wood block suitable for printing. Such blocks gave a clear impression on ordinary paper, that is, not having a specially smooth or glossy surface.

These blocks were to be made by the Toronto Engraving Company on Bay St. The leading members of this firm were named Brigden, one of them being the distinguished artist Fred H. Brigden. We decided on the style of the lettering on the figures. We did not choose the so-called 'block' letters, but that ordinarily used in printing. They would match the capital letters of the text. The original drawing was usually made three times the size of the final figure. In this way any slight irregularity



in the drawing would be rendered hardly noticeable in the final picture.

The artist assigned to do this work was Frank S. Smith. He was a competent wood-engraver as well as an excellent 'commercial' artist. Usually I would make a sketch of what we wanted and I would explain to Smith what it was intended to illustrate. He quickly understood. He then would make a good pencil drawing which he would submit to Merchant and me. Any alterations we desired would be made, and after it had been approved by both of us he would draw it over in india ink. In the case of small drawings, eight or ten might be put on a single sheet of cardboard. They would be photographed together on a single zinc plate and etched together in the same acid bath. When the etching process was completed the individual figures were <sup>or</sup> ~~sown~~ apart and mounted on separate wooden blocks.

In this way we obtained a uniform series of clear diagrams, or line-illustrations, everyone of which was original. Besides these we had three photographs of waves on the surface of mercury which were not suitable for zinc reproduction. Of them "half-tone" copper plates were made, which for best results should be printed on special shiny paper, but they looked very well on the paper used in the book.

At this time some authors had introduced into their text books on physics portraits of distinguished scientific men, and we decided we must not fall behind in this matter. So I chose nine great pioneers in "natural philosophy" - Newton, Boyle, J.J. Thomson, Kelvin, Joule, Faraday, Volta, Ampere, Ohm - and



supplied portraits of them. Of these F.H. Brigden made beautiful pen drawings, from which superior zinc blocks were made. Including these, there were 586 figures on 489 pages of text.

Afterwards I wondered if one pupil in a thousand of the middle school would take any interest in these scientific worthies. At this stage of their education they are too young to appreciate the historical side of their studies. Often, I fear, they take pleasure in defacing the portrait.

#### Dividing up the Work

It was arranged that Dr. Merchant would prepare the parts dealing with Heat and Magnetism and Electricity and a portion of the Mechanics; and I should take the rest. We expected the "job" before us might occupy three years and began at once.

Dr. Merchant had already prepared several text books and had had an extended experience in teaching the science of the different grades. Naturally he would take chapters which he had prepared in previous years, make any alterations which experience had shown desirable and hand them over to me. I had spent fifteen years in teaching physics, some of it elementary, some advanced, but to write a text book of a middle school grade of difficulty, required much consideration. Further, after deciding what I wished to say, I was anxious to say it in simple lucid language which could not be misunderstood.

In a couple of months we had some chapters ready for discussion together and for setting in type. I carried some samples to the foreman of the type-setting department. At that time all this technical work was done by hand. While Dr. Merchant usually



had a capable secretary in his service and had his 'copy' for the printer typed, I found that when symbols and numbers were involved I could make my copy free from errors if I wrote it by long-hand. Indeed Foreman Briggs paid me the compliment of stating that he preferred my handwriting to most typescript which came before him.

#### Examples at home and in Industry

In the various branches of our subject an attempt was made to illustrate the principles and laws of physics by reference to applications in ordinary everyday life. Other illustrations were taken from the chief applications to industry and commerce. Two outstanding achievements in Canada at this time were the great hydraulic air-compressor at Ragged Chutes, near Cobalt, which supplied compressed air to the mines within a number of miles; and the noted hydraulic lift-lock on the Trent Canal at Peterboro. These were duly described.

At this period the incandescent lamp used and described had a carbon filament, and although the tungsten lamp was mentioned it was in its early stages of development and had not created an epoch in electric illumination. Arc lamps were featured for street-lighting and the self-regulating type was described. Wireless telegraphy was in its infancy and the coherer was the accepted device for receiving electric waves. Radio had not been invented. The last paragraph in the book deals with radio-activity and the disintegration of matter.

The authors would discuss each others compositions and it usually fell to me to make final changes in order to have a



certain uniformity and homogeneity through the book.

In order to avoid captious criticism by some teachers the Department of Education asked a small committee of representative teachers to examine printer's proof of the book, a number of copies of which had been bound together in page form. They suggested a few small alterations which we were pleased to make.

The pages of the book were  $5 \frac{3}{8}$  x  $7 \frac{1}{2}$  inches, - rather wider than the usual form. This gave a certain sense of spaciousness and displayed well the large type and the figures.

The preface is dated June 1911. On the title page is: Authorized by the Minister of Education for Ontario for use in the Middle School.

The number of copies sold in the first school year was 12,300.

#### Second Edition of the Physics

The Ontario High School Physics was first published in 1911. Being authorized in Ontario, its use was wide from the beginning; but before many years I believe it was found in the schools of every province of the Dominion. Very few complaints or criticisms were received by the authors.

After ten years of service we decided it would be well to revise it. At this time Dr. Merchant was Director of Technical Education and acting Chief Director of Education for Ontario, and could not undertake any part of the actual work of revision. We were fortunate in securing the assistance of George A. Cline, Instructor in Physics in the University of Toronto Schools. He



was a former student of mine, having graduated in M. & P. in the University in 1909, and was one of my <sup>e</sup>steemed friends. In the First World War, Cline rendered distinguished service. He was especially efficient in the signalling branch.

We gave the book a thorough revision. The greatest changes were in the part dealing with electricity. Cline was an expert in radio-communication, which he treated in a comprehensive and modern way. But he had used the book in his classes for some years and knew just where it could be improved.

Some discoveries in radio-activity were described in the first edition, but in this one the essential facts were given more fully. I should like to quote the last two paragraphs of the text, which refer to atomic energy, now the chief subject of scientific discussion and of warlike <sup>a</sup>preparation:-

It has been found that the atom of a radio-active substance spontaneously disintegrates and gives rise to a new atom distinct in physical and chemical properties from its parent. Hydrogen can be transmuted into helium, and when this takes place a certain amount of energy is set free. It has been computed that, if we could transmute the hydrogen contained in one pint of water, the energy so liberated would be sufficient to propel the Mauretania across the Atlantic and back at full speed.

It is now the dream of the physicist to discover how to utilize for the service of man the great stores of energy which are locked up in the atoms. With the poet Tennyson, he can say:

To those still-working energies  
I spy nor term nor bound.



In the first edition there were 504 pages and 577 figures. In this second, 552 pages and 631 figures. It was published in the summer of 1923, still bearing the name Ontario High School Physics, but shortly afterwards this was changed to Elements of Physics.

MS  
See p. 324 = p. 387 *infra*

### Third Edition

After another ten years we began to think again of revision, in order to keep the text up-to-date. Dr. Merchant was Chief Director of Education, 1924-30, and then was Chief Adviser to the Minister of Education, 1930 - 34, when he retired. I myself for over twenty years had given much attention to Astronomy and from 1928 <sup>onwards</sup> was busy planning and building the David Dunlap Observatory.

We endeavoured to secure the services of some teachers of physics who could carry the work through under our direction.

Ultimately I was able to secure the active assistance of A.C. Lewis, Headmaster of the University of Toronto School; D.S. Ainslie, Associate Professor of Physics, U. of T.; and R.J. Lang, Professor of Physics, University of Alberta. On July, 1, 1935, I retired from active service on the staff of the University and was able to give my entire attention to the matter of <sup>re</sup>vision. Indeed it gave me much pleasure to be strenuously engaged in this work. Dr. Merchant died Jan. 29, 1937, in his 82nd year, and the book was not ready until the following August.

To the title Elements of Physics I added "for Canadian Schools". The reason for this was at once evident to any person



examining the book. I eliminated the portraits of physicists and substituted 35 plates illustrating great achievements in the line of science or engineering, nearly all of which were to be found in Canada. About one-third of these related to our great mines in the north, and some of the photographs were taken specially for the book. My hope was that these pictures, with the brief but clear descriptions, would arouse the interest of the student and make him proud of his country. The plates were printed on the smooth paper used in the book and, I think, were eminently successful. The book contained 666 pages and 716 figures in addition to the plates. Indeed it was a handsome production and at a very low price.

As in the second edition, so in the third there was a thorough revision. Some sections were omitted, others were rewritten, and many new ones were added. These additions were chiefly in the portion devoted to Electricity and to the part dealing with Sound. For many years this branch of science had been pushed into the background, but recently its wonderful applications to moving pictures, to radio, to the transmission of voice in long-distance telephony, to architectural acoustics—chiefly in the designing of auditoriums—and in some other cases, had led to deeper study; also there had been a gratifying revival of music in our schools, which created fresh interest in the study of sound.

The order in which the different branches of Physics were taken up was also changed, following the experience in teaching the subject, and for the same reason the chapters were shortened



and increased in number.

Some old diagrams were omitted and many new ones were added. They were drawn specially for this work. In treating the various topics a sincere attempt was made to give clear logical explanations, not just a picture with a general title beneath it.

### Laboratory Manual in Physics

At the same time as the Text Book, a Laboratory Manual was published, and with each revision of the Text there was a revision of the Manual.

Dr. Merchant was very busy with the rapidly expanding work of the Department, especially in the matter of technical education; and the preparation of the Manual was left to me. I secured as many sample manuals as I could--mostly from the United States--and read them carefully. My experience in conducting the Elementary Physical Laboratory at the University was also of much value to me. I knew where the young experimenters often went wrong, and I had prepared, and mimeographed, instructions for my own students. I had never taught in a high school of the Province, where conditions vary greatly from one place to another, but I gave much time and thought to compiling a suitable series of experiments to accompany the text book. There was not much originality in the Manual but I hoped it would be useful to the budding scientist.

The first edition (1911) ran to 136 pages and contained 128 experimental exercises. Some of these were outside the course prescribed for the Middle School, but were included



because they were interesting and simple to perform. A considerable number of the exercises were qualitative, being intended to introduce new ideas and to stress fundamental principles; but the majority were quantitative and designed to introduce methods of accurate measurement of physical quantities of various kinds.

The pupils were not asked to buy copies of the book, but a sufficient number of copies were to be purchased by the school for each pupil to have one for his use when he was working in the laboratory.

In the book, apparatus as simple as possible to perform the experiment under consideration was illustrated, and the student was encouraged to construct his own. But at this time the teaching of physics had grown so widely that the necessary apparatus could be purchased in the Province. This was very different from the state of affairs fifteen years earlier, when practically all physical apparatus had to be imported from the United States or from abroad.

I believe the Manual answered its purpose quite well. Of course many schools were poorly equipped, both with men and with apparatus, to teach physics in the experimental way— and such will always be the case.

It was not just in the secondary schools that there were great advances in the teaching of science, but also in the Universities, in which many large and expensive buildings were being constructed. In Toronto the Chemistry building was opened in 1894, and the Physics building in 1907. All these great changes



in our educational system have led directly to greater attention being paid to scientific research, which indeed, has transformed our manner of life.

The second edition of the Manual was published in 1924. Before beginning the revision, criticism of the first edition by the teachers was solicited, and one of them wrote; "It does not suit the course of the Middle School as given in the Text. I have to spend too much time with the experimental portion to do it with any degree of satisfaction to myself." In preparing the new edition, my first consideration was to overcome this criticism, and with the invaluable assistance of Mr. Cline, I think it was successfully accomplished. Alterations and additions were made so that the course of the experimenting closely followed the treatment of the subjects in the Text; and the book was rendered more suitable to be placed in the hands of the students and to be used by them with the smallest amount of direction from the teacher.

The introduction to the book was <sup>a</sup>carefully prepared chapter giving general instructions to the student. At the end there was an appendix, containing suggestions for teachers and a detailed list of apparatus required for the experiments to be performed in concert by the students— 12 sets of apparatus to be used by 24 students working in pairs. That had been found the most effective way of working. This edition contained 166 pages and I was much pleased with it.

The third edition of the Manual was issued in August 1938, and the changes introduced were to make it conform with the



revised Text Book published in the previous year.

In addition to continued help from Mr. Cline, I had the active co-operation of A.C. Lewis, Headmaster of the University of Toronto Schools. The object in the revision was to make the book as practical and labour-saving as possible, both to teachers and students. The pages now were 176.

### Elementary Physics for High Schools

Immediately on publication, the Ontario High School Physics was introduced into the schools of Ontario, and its use soon spread to other provinces of Canada. A year or more later there came a request, chiefly from the eastern provinces, I believe, for a smaller and simpler book. It had been found that, in the time available, the material in the book was too great to be mastered. Dr. Merchant wished me to undertake the reduction of the book to meet this demand.

In doing so, whole chapters of the larger book were omitted. Some subjects were left out or treated much more briefly. But it was not all omission or simple abbreviation. Very often paragraphs were re-written and if possible shortened. I could not just make a selection of material from the larger work but had to fashion it so that the student passed naturally from one chapter to the next and felt an adhesion among all the parts.

The result was a great reduction in the size of the work. In the original book there were 504 pages; in the new one, 232. I was sorry to see such a reduction, as I felt the general nature of the book was somewhat changed. I could not compress the contents so much without squeezing out some of what I con-



sidered the life-blood. The 'atmosphere' of the book was not so experimental or practical. All through the larger book the idea of obtaining knowledge through experiment is prominent. Also the little details in description, with perhaps an added historical touch, made the story more interesting. When these are wanting the book is not so attractive to the reader.

However, the book seemed to satisfy the demand. It was published in 1914 and its sale continued regularly until 1939 when the company decided not to reprint it any further. During the 25 years over 52,000 copies were issued.

#### The Text Book on Mechanics

At the time when it was determined to prepare a text book on Physics and a Laboratory Manual to accompany it, it was also decided to have a new text book on Mechanics for use in the Upper School. Dr. Merchant, who certainly was ambitious and enterprising, was the author of the texts used for some years in both the Middle and the Upper School.

It was arranged that he and I should undertake the Middle School text, but that Prof. A.L. Clark of Queen's University should be associated with Dr. Merchant and me in preparing the Upper School book. When the Ontario High School Physics and the Laboratory Manual had been completed and were in regular use in the schools, the time was at hand to start on the new text for the Upper School.

Now Dr. Merchant was deeply engrossed in the task of organizing the system of technical and industrial education for the Province, and Professor Clark seemed equally busi



in Kingston. So it was suggested that I prepare some chapters on Mechanics and allow the other two to read them. After much planning how best to treat the subject, and further months of reading and consideration, I composed several chapters which I gave to Dr. Merchant to read and then sent on to Dr. Clark. They were very generous in their praises. Indeed the latter was decidedly outspoken in giving me credit for the success of the High School Physics, and he expressed pleasure that I was preparing the Mechanics,--that even if he had the time he could not do so well! So I went ahead.

Now I thought that Mechanics was an excellent subject for teaching the meaning of the fundamental concepts in physics, and that the study of it was a fine training in "straight thinking". The book was to be used in the Upper School, the students in which have a certain maturity of mind, and no greater service can be done to them than to lead them through an extended continuous course in a subject requiring a high level of thinking. The radio or the motion picture may give pleasure or information or perhaps inspiration, but their contribution to one's education is negligible.

I set out to write a new book on Mechanics as original and interesting as I could make it.

In ordinary conversation the words acceleration, momentum, force, energy, <sup>etc.</sup> ~~ie.~~, are used in a loose, inconsistent way, with no clear meaning in the mind. I devoted much time and thought to explaining their significance, and to leading the student from one to another. Also considerable space was given to common



applications of mechanical principles. The automobile was just coming into widespread use and frequent reference was made to it.

The Model T Ford car had a peculiar transmission and I gave eight full pages to an explanation of it. I borrowed from the Ford plant in Toronto, a complete transmission put together, as well as a set of the individual parts. These I arranged on a table in one of my laboratory rooms at the University and my assistant J.P. Henderson took a number of negatives of them. From these, blue prints were made, and my artist "inked them in" with india ink. Then the blue was removed by chemical means and the result was some excellent line-drawings.

The operation of the transmission with the gears set for slow, reverse and neutral. was hard to explain, and the numerical calculations were tricky, but by a series of diagrams I think I made it clear, and we made several computations. These I sent to the Ford Company in Detroit for verification and they sent a printed Bulletin on the matter, which showed that our calculations were correct.

In preparing the diagrams in a book like this an expensive part is the lettering. To do this well requires skill and time or the final result will be cheap and amateurish. The cost of the figures in the High School Physics ran into thousands of dollars. In an attempt to reduce the cost, sets of letters and numbers were printed on sheets of white paper. The artist (the same as for the Physics) would draw the diagram and then cut



out the letters and paste them on the drawing. The result was quite satisfactory.

### Air Pump

The air pump has been one of the most important scientific instruments since about 1650 when it was used in famous experiments on the air and in supplying the true explanation of the barometer. Two centuries later various forms of the instrument were devised for <sup>use in the manufacture of</sup> producing tubes through which electrical discharges were sent. After that, early in the present century, when x-ray tubes and incandescent light-bulbs were being made in large numbers, suitable pumps were invented to do this work efficiently and at reasonable expense. Of course I described some of these air pumps, but just when I was preparing the chapter dealing with them, there was published an account of a new air pump based on a new principle. It was called a 'condensation' pump and was invented by Irving Langmuir of the General Electric Research Laboratory at Schenectady, N.Y. From him I obtained his own description of the pump, together with a blue print of a vertical section of an actual pump. From the latter a figure was made which, with an explanation of the operation of the pump, was inserted in the book. I believe this was the first book on physics to contain an account of this important invention. It is generally called a "diffusion" pump and, I believe, is capable of producing a more perfect vacuum than any other kind of air pump.

A chief use of the diffusion pump is in the process of coating mirrors used in reflecting telescopes with a layer of aluminum. Until quite recently silver was deposited on the mirror



by a chemical method, but a layer of aluminum is much more efficient. First the surface to be coated must be made absolutely clean. Then the mirror is placed in a chamber, or tank, from which the air can be 'completely' removed. This is accomplished with the diffusion pump. Then bits of aluminum wire, properly placed within the tank, are evaporated by electrical discharges through them and the molecules of aluminum vapour strike the mirror surface and adhere to it. The more perfect the vacuum the better is the aluminum surface.

At the David Dunlap Observatory at Richmond Hill, the great mirror is the concave upper surface of a disc of glass 76 inches across and weighing 2½ tons. The iron tank, constructed in 1941, is 7 feet in diameter and 5 ft. 4 in. in height, and to pump the air out usually requires 24 hours of continuous operation.

With some alterations suggested by experience, the chapters on surface tension and flow of fluids which I had prepared in 1911, as a supplement to Merchant's Mechanics were included in the book. Following this I showed how heat measured in calories and electrical energy in ergs or joules are fundamentally connected with mechanical work and can be transformed one into another. Finally I discussed the buying and selling of energy as carried on by the Hydro-Electric Power Commission of Ontario, which was created in its present form by an Act passed in 1906, following conventions in June 1902 and later. It was at this time constructing the great generating plant at Queenston. I gave samples of the bills issued to customers of the "Hydro" in the town of Clinton where my brother was in charge of public utilities.



For some reason unknown to me I had been honored with an invitation to the State Dinner at the Opening of the Legislature Jan<sup>y</sup> 24, 1907; and there I met Adam Beck, the Chairman of the H.E.P.C. of Ontario, who was very active in extending its operations over the Province. When the book was printed, I sent him a copy. (1919). Just recently he had been defeated in an election for the Ontario Legislature, in his home town of London. He was I believe, somewhat autocratic and ruthless in carrying out his plans for the Commission. In a letter to him, I expressed my regret at the action of the voters of his constituency who did not appreciate the outstanding service he had given to the Province. He was interested in the text book but more so in my remarks on his undeserved defeat in the election.

The number of pages in the book was 318, almost the same as in the book which it displaced.

The Mechanics for the Upper School was well received.

After almost ten years of use I suggested to my friend Cline that it was time for a revision. He had been teaching from it all that time and knew just where it could be improved. In the text very few changes were made, but many new practical applications were introduced and a brief discussion of the airplane was added. The new edition appeared in 1931; it had grown to 390 pages.

For another ten years the book was in constant use. Not a complaint came to me and the number of copies printed steadily increased. Then a proposal was made that the course of study in the Upper School be changed - that other subjects besides Mechanics be introduced. The proposal was to omit some of the Mechanics and bring in a discussion of wave-motion; of interference, diffraction



and polarization of light; and of applied optics as illustrated in the lens, the microscope and the telescope.

This was put forward by Prof. J.K. Robertson of Queen's University. I was opposed to the proposal. I interviewed George ~~F~~<sup>E</sup> Rogers of the Department of Education, who was in general charge of the secondary schools of the Province, and urged that this change would mean a lowering of the standard in the Upper School. I contended that the Mechanics was a self-contained and continuous course, of the proper level for training the minds of the senior students, while what was proposed formed a disconnected set of parts, largely of a lower grade of difficulty. I found that Mr. Rogers<sup>r</sup> shared my views.

I also discussed the matter with Prof. E.F. Burton, the head of the Department of Physics of the University of Toronto, who agreed perfectly with me. I urged that he and his staff present the case against the proposed change. At this time my duties were almost exclusively in the Department of Astronomy. But he was very busy with other matters and nothing was done. However, the proposal was brought up again a year or two later, and for lack of formal opposition it was adopted. Then action was taken and a formal protest was made, but it was too late!

This meant that my text book did not cover the new prescription of work. Further, I learned that a new text book had already been prepared for that very purpose.

Now an examination of the third edition of the Elements of Physics (1937) and the second edition of the Mechanics (1931) showed that together they contained a treatment of nearly all



of the new course. Dr. A.G. Croal of the Ontario College of Edu-cation undertook the task of selecting from the two books named those portions relating to the new course, of making any required alterations in these parts, and of supplying new portions to make the book cover what was lacking. In doing this he was assisted by his colleagues G.K. Brunt and G.A. Cline. The work was quickly accomplished and the Copp Clark Co. had the book ready in the summer of 1945.

This third edition of the Mechanics bears the name Upper School Physics. It keeps up the tradition of "Merchant and Chant" and I believe it is entirely successful

(1950)

Nov. 26, 1950

#### American Edition of the Physics

The second edition of the Physics, published in 1923, pleased me greatly. I thought it the equal of any middle-school text that I had seen.

The teachers who had used the first edition had been invited to send in criticisms or suggestions. These I carefully considered and many of them were used. The book was improved thereby. Whenever a change in the wording would take away some of the technical stiffness without impairing the p<sup>r</sup>ecise reasoning the change was made. Also, the newest discoveries, especially in electricity, were clearly described. Further, I hoped that the few references to Wordsworth and Thoreau and Tennyson showed that the great writers had an interest in science and gave a slight literary touch to the book.

I wondered if some firm in the United States would bring out an American edition. The matter was discussed with our publishers,



and the well-known firm of Henry Holt and Co. of New York expressed a wish to do so. An agreement was reached by which the Copp Clark Co. would supply to the U.S. firm page plates, duplicates of those used in printing the Canadian edition, with slight alterations in spelling and in illustrations to suit the United States market. I went over the Canadian text and marked the changes to be made. A chief one was the spelling of favour, labour, and similar words without u. Indeed I have looked up some of my public and high school text books and also the University Calendars during the 'nineties' and find these words spelled without u. I am sorry the "official" spelling adopted later demanded its use. The newspapers, and hence the public generally, still use the shorter form.

In place of a big generator in the Queenston Hydro Power Station I substituted a slightly larger one of the Niagara Falls Power Co. across the river; and for the 72-inch reflecting telescope at Victoria, B.C., I pictured the 100-inch reflector on Mt. Wilson in California. Similarly in some other cases.

The book was published in 1924 and enjoyed some success over a number of years, but it did not continue as long as I had hoped.

#### Text Book of College Physics

The Henry Holt firm appreciated the goodness of the elementary book and soon after it was published asked me if I would prepare a Text Book of College Physics. This was flattering to me and I agreed to do so if Prof. E.F. Burton of the Department of Physics would collaborate with me. He agreed and we began our



labours. The first part he undertook was on Sound and I thought it admirable. I was anxious that he should do the Electricity, as I was not familiar with the latest advances in that subject, as I had been giving most of my time to Astronomy. He was very busy with the work of his department and the book was delayed. It was published in 1933.

A feature of the book was the chapter on the Physics of the Atmosphere by my friend Andrew Thomson, B.A. '15, of the Canadian Meteorological Service, later its Director. It was thoroughly modern in treatment, giving the methods of investigation <sup>and</sup> the results obtained.

The book achieved some success and was used to some extent in the University of Toronto. Its adoption as a text book never was very wide, and it was not pushed by advertisement or active salesmanship.

My experience showed me that there is a fundamental or latent feeling in some countries adverse to the adoption of a text book on science written by a resident of another country.

Sales of Text Books up to July 1, 1950

|                                   |         |
|-----------------------------------|---------|
| High School Physics - - - - -     | 433,032 |
| Laboratory Manual - - - - -       | 78,066  |
| Mechanics - - - - -               | 77,232  |
| Elementary H. S. Physics- - - - - | 52,066  |







## XVII Our Wonderful Universe

### A Set of Astronomical Lantern Slides

In the Autumn of 1925, William Park, who had been a teacher in Brantford, Ont., called to discuss with me the subject of "visual education". He was urging the production of films to illustrate astronomy and other related branches of science, and had interested a Toronto firm sufficiently to have them make a film to illustrate the motion of an area-of-low-pressure across the earth's surface, --how the big air-mass moves eastward and at the same time has a rotational motion within itself. He arranged for this film and a projecting machine to be brought to the University and the film shown in one of the lecture rooms. I had asked W.E.W. Jackson of the Meteorological Service to come down to see it. The film was pretty crude, and the motion exhibited on the screen had little resemblance to that performed by the moving air-masses of the atmosphere. The making of a film of astronomical phenomena is usually a difficult and expensive job and not many good ones have been produced.

Mr. Park asked me also about producing a set of astronomical lantern slides. In my work at the University I used numerous slides, and over the previous twenty years in the department of astronomy I had<sup>made</sup> many astronomical slides myself and<sup>had</sup> obtained others from sources far and near. I expressed a willingness to co-operate with him in such a project.

Further, I had been editor of the Journal of the Royal Astronomical Society of Canada from its beginning in 1907 and had gathered together a large number of good photographs of celestial



objects, many of which I could use to advantage in making up a set of slides.

Mr. Park interviewed members of the Toronto Board of Education and received a promise to purchase 16 sets of 100 slides at the price of \$75 per set. Thus assured that we should not suffer a loss over this undertaking, I began work on it.

### Planning the Set

I carefully considered the line of thought I should follow in developing the subject; and decided, in a general way, what slides I should use. I realized, also, that I should have to prepare a 'handbook' to describe the picture as thrown on the screen and to build up the argument it was intended to illustrate.

I divided the subject into four parts. In Part I I proposed to give a clear idea of the structure of the Universe as conceived by modern astronomers, and I aimed to develop this from the observational point of view. For some years I had been doing this with my elementary classes. When we were out under the open sky I directed attention to the celestial sphere, i.e., the sphere (apparently) formed by the sky. By observation of the motion of the stars, especially as recorded by photography, we located the north celestial pole and then the south celestial pole; after this came the celestial equator, the ecliptic and other imagined lines on the sky. When we were in the lecture room, by means of models I impressed the meaning of these terms. The observing astronomer treats the celestial sphere and the circles on it as real things and I wanted my beginners in astronomy to have a definite picture of them in their minds.

For many centuries astronomy has had great influence on



human thought and has given rise to great controversies. In this first part I made a special effort to show how easily one can be deceived and how a person must exercise his reasoning powers to decide what is true and what is false.

To illustrate these matters a series of new drawings of the celestial sphere were made to my instructions by a professional artist —the same one who had helped me in the "High School Physics". They were beautifully done and were very effective. Also, with a specially constructed apparatus, photographs were taken to show that the appearance is the same whether the earth revolves about the sun or the sun about the earth; and whether the earth stands still and <sup>the</sup> sky revolves about it or the sky with its stars is fixed and the earth rotates on its axis. We must use other means than simple appearances to settle these fundamental questions.

The first 19 slides of the set were used in this introductory part of the course. I tried to build up our notion of the Universe by starting out from the earth, then going out to the sun and its system, and then to the stars far beyond. The 19th slide gave a birdseye view of the Universe. In it two little celestial travelers, a boy and a girl, were supposed to have been transported out into space a thousand million miles in the direction of the North Star and to report what they saw. Back whence they came they saw the sun, the earth with its moon and the other planets as they revolved about the sun, and also other objects in the solar system. Then, as they turned about, in every direction they saw the fixed stars, looking just the same as they did from the earth! They declared it was a Wonderful Universe!

The picture for this slide was drawn by my daughter Etta



(Mrs. Hopper), as was also No. 35, which showed the same little travellers off in space observing how an eclipse of the sun is produced. They were both sprightly and charming pictures. Some years afterwards a well-known Washington astronomer inquired of me where he could secure a copy of the eclipse slide.

Part II of the slides (20-42) illustrated, first, the Solar System as a whole, and then gave some details of the earth, the sun and the moon.

Part III (43-74) took up the planets, one by one, and then comets and meteors.

Part IV (75-100) was devoted to the stars, the nebulae and star-clusters; and included many remarkable photographs.

Of the slides, 24 were hand-painted, 24 were tinted and all were of high quality.

The Handbook contained 60 pages. It was designed to be read aloud as the slides were thrown on the screen, the moment for projecting each slide being indicated in the text. We had 100 copies printed; it is dated 1926.

The slides were a decided success. Just how many sets were sold I cannot say - perhaps 60.

For the Department of Astronomy at the University I had purchased several pieces of apparatus from the Eastern Science Supply Co. of Boston and was acquainted with its proprietor, H.W. Geromanos. I told him about the set of slides and he wished to handle them in the U.S.A. So I had a duplicate set of negatives and also a pattern set of slides sent to him, along with some copies of the Handbook. He was pleased with the slides and ad-



vertised them widely, stressing their high quality. Not many complete sets were sold; the price was considerably higher than in Canada. There was an active demand for the slides at least until the second world war.

After a couple of years, I offered to donate to the Department of Education of Ontario my set of negatives and also a pattern set of slides, if they would undertake the manufacture and distribution of the slides. They accepted my offer and their first undertaking was to prepare 275 sets in order to supply one to each high school in the province which had the facilities for showing them.

I do not know how many sets have been made, but I have received inquiries about them from various places. The last was in November 1950, from the professor of geology in Kansas State College of Agriculture and Applied Science. I referred him to the Minister of Education for Ontario, and presume a set was sent to him as the Department has been very generous with them. (Dec.1950)



OUR WONDERFUL UNIVERSE

Having brought together a number of beautiful drawings, some interesting and easily understood diagrams, and many remarkable photographs of astronomical objects; and having prepared a booklet explaining these illustrations in a regular series; I thought I could write a simple introduction to astronomy which would appeal to our young people — of all ages. So I revised and expanded the Handbook prepared to accompany the slides and added a considerable number of illustrations, making 137 in all.

I took the typed text and samples of my illustrations to the Ryerson Press and showed them to its editor, Dr. Lorne Pierce, who said the Press would publish the book. One of the senior members of the staff (E.W. Walker) just then was making a business trip to England and took the manuscript with him, thinking that ~~the~~ <sup>the</sup> job might be better done if printed in Great Britain. The well-known firm of George G. Harrap and Co. was willing to publish the book.

The manuscript came back and I carefully revised it and also the drawings and photographs for the illustrations, so that there should be ~~a~~ few corrections in the printer's "proofs" later on. The "copy" was then returned to England.

The book came out in the summer of 1928. In this first issue there were 6000 copies, some of them bearing the imprint of Ryerson Press, Toronto, and some that of the World Book Co., Yonkers, New York, which undertook to publish the book in the United States.

In the summer of 1928, I attended the meeting of the International Astronomical Union at Leyden in the Netherlands, and,



immediately after it, a meeting of the Astronomische Gesellschaft at Heidelberg in Germany. Here I met H. Ludendorff of the Potsdam Observatory. I gave him a copy of the book and told him I should like very much to see it published in the German language. After examining it he told me that the big firm of Julius Springer in Berlin was issuing a series of small volumes on Verständliche Wissenschaft (Understandable Science) and he would recommend them to include in it my book as their volume on Astronomy.

So I asked Harrap to send to Springer the material for the illustrations; and next year the book was published under the title Die Wunder des Weltalls, being No. 9 of the series.

Then some of my astronomical friends in Prague, of whom one was Josef Klepešta, whose remarkable photograph of a magnificent fireball I had included in my book, expressed a desire to have the book published in the Czech language. Of course I was agreeable. The drawings and photographs for the illustrations were sent from Berlin to Prague and, losing no time, the book, entitled Divy Vesmiru, came out in Prague in 1929.

Soon after this the firm of Trzaska, Evert & Michalski, in Warsaw, asked permission to print a Polish edition of the book. This I was happy to grant, and it was brought out in a handsome volume. The title was Cuda Wszechświata and it was Vol. 1 in a "Scientific Library". The drawings and photographs for the illustrations, after being used in these volumes in four languages, were returned to me in Toronto.

There were favourable notices of the book in the great scientific journal Nature, in The Times Literary Supplement and in other



British publications. There were also extended reviews in the Toronto Globe, the Toronto Star and other papers in Canada. In every case it was highly recommended. But what pleased me most was the warm approbation of my fellow astronomers all over the world. Even before I became acquainted with the member of the staff of the U.S. Naval Observatory at Washington whose duty it was to show to the public, through the 26-inch refractor, objects in the sky, I learned that he recommended my little book to all inquirers for an elementary book on astronomy. I met him (H.E. Burton) at a meeting of the International Astronomical Union in Stockholm in 1938, and I found out that he obtained half a dozen copies of the book at a time in order to supply them to his visitors.

It gave me much pleasure continually to meet persons who had read the book. It seemed to me the most appreciative were the medical men. I collected, as fully as I could, the various printed notices of the book and the letters I had received regarding it and had them bound together. They made an interesting volume.

The book was reprinted in Jan. 1929, April 1931, Oct. 1935, March 1937.

By this time I thought a new edition should be prepared and the publishers were agreeable. Some changes were made in Part II which deals with the solar system, in order to include new discoveries; but Part III, which is devoted to the distant stars, was entirely re-written and greatly enlarged, in an effort to present clearly a view of the Universe as revealed by the most recent investigations made with modern great telescopes.

The number of pages was increased from 191 to 281, and of



illustrations from 138 to 217. Thus it was properly described as "revised and enlarged". It certainly was much improved.

In 1928, Mrs. David A. Dunlap had informed me that she would present to the University of Toronto --and the world-- the David Dunlap Observatory, and so the first edition of the book was dedicated to her as "a generous friend of astronomy"; but in the new edition there were pictures of the great new observatory, including its 74-inch telescope, which at the time of the official opening of the Observatory on May 31, 1935, was the second largest in the whole world. An account of some of the work which had already been done at the Observatory was also given in the book.

#### Lord Mayor's Distress Fund

The publication of the new edition was somewhat delayed and by June 1940, when it appeared, the world was deep in the second great war. I wrote to Messrs. Harrap, the publishers, that I should be pleased to donate to any charitable fund they should name any profits which might accrue to me from the sale of the book. The fund chosen was the Lord Mayor's National Air Raid Distress Fund.

In the case of a little book like mine one would not expect the royalty to amount to much, especially after the Government tax has been sliced from it. However, each year the publishers sent to the Fund what was left and the Lord Mayor sent me an official receipt. The amounts were:

|          |      |       | £  | s  | d  |
|----------|------|-------|----|----|----|
| For year | 1940 | - - - | 11 | 7  | 4  |
| " "      | 1941 | - - - | 8  | 18 | 8  |
| " "      | 1942 | - - - | 6  | 12 | 7  |
| " "      | 1943 | - - - | 23 | 18 | 10 |
| " "      | 1944 | - - - | 4  | 7  | 7  |

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Total      55   5   0



I was astonished at the amount for 1943. Where did the books go to? I have been a subscriber to The Times Literary Supplement for many years and I receive a great number of catalogues of new and second-hand books; and I am continually being surprised at the number, the variety and the general high quality of the books published in Great Britain. From the journal mentioned (T.L.S., Jan. 12, 1950) I learn that in the year <sup>1950</sup> ~~1937~~ in the United Kingdom the number of new books published was 17,137. This is the all-time high although it is only 65 above the number for <sup>1949</sup> ~~1950~~. I believe this record has not been equalled by any other country. What becomes of them all?

After the war, the Lord Mayor sent me a copy of his Report on the Fund, September <sup>10</sup>, 1939, to June 30, 1946. It contained many pictures showing the awful destruction caused by the terrible air raids, as well as information regarding the administration of the Fund. I noted that the total receipts in the period named amounted to £4,713,245. of which Canada contributed £1,137,097 and of this the readers of the Toronto Evening Telegram supplied £593,914.

From the above table it would seem that in 1944 all the available copies of the book were sold. Soon after this I received inquiries from various persons about obtaining copies. I wrote to the publishers regarding a fresh reprint, but the authorities did not consider the book an essential publication, such as school text books, and it had to wait. Repeated applications for permission to reprint were made and at last it was approved. This second impression of the new edition was published in November 1948. It bore this statement: "This reprint is in conformity with the authorized economy standards". The paper was not as good as in the first



impression of 1940 and the pages did not have such generous margins, but the printer had done a creditable job and the book still had an attractive appearance.

### Spanish Edition

A letter from Javier Morata, publisher of "Ediciones Morata", in Madrid, Spain, dated Jan. 16, 1942, reached me on Feb. 13, that is, four weeks after being posted. In it he referred to the German edition of my book and asked on what conditions he would be allowed to produce an edition in the Spanish language, which he hoped to sell in Spain and (South) America. Under date Feb. 18, 1942, I replied that I should be pleased to have a Spanish edition published but I said it should be of the second edition of the book which was issued in 1940. I offered to provide the drawings and photographs for the illustration. The condition I named was that he should pay me a royalty of 10% on the retail price of each copy sold. My letter did not reach Madrid until Feb. 3, 1943, nearly a year later. Morata answered on that very day and his letter reached me on March 9, that is, in five weeks. He accepted my terms. These and other letters I received illustrate the uncertain communication in war-time.

As I have already stated, the drawings and photographs used for the illustrations in the first edition had been returned to me after the Polish edition had been published, and were now in my possession. For the extensive additions in the new edition, about a hundred new drawings and photographs were sent to London and had not been returned to me.

Under date April 5, 1943, I sent to Morata, a copy of the new



edition of the book in order that its translation into Spanish might begin; and on April 14, I sent by first-class mail the drawings and photographs which I had beside me, and I stated that Messrs. Harrap would send direct to Madrid, those which they had used in the enlarged edition. But when I wrote to that firm to do this, the managing director replied that all the original drawings and photographs which were in their possession had been destroyed in an air raid in January 1941.

At once I began to secure new material to replace what had been destroyed. By November 15, 1943, I had sent all that was missing and I requested Morata to return all the drawings and photographs as soon as he had made use of them.

Then months and years elapsed before I received trustworthy information about what was being done in Madrid. At last, however, the material for the illustrations, <sup>together with</sup> and a copy of the new book reached me on July 25, 1947, and other copies came on Aug. 21.

The Spanish edition, bearing the title Nuestro Maravilloso Universo, is beautifully produced. A Spanish Astronomer, Rafael Carrasco Garrorena, made the translation and Enrique Gastardi, Assistant Director of the National Observatory, provided a well-informed and pleasing introduction. The date is 1946.

When I visit my castle in Spain I shall try to collect my royalty.

#### French Edition

From the time the first edition of the book was published I had a wish that it might be translated into the French language. I communicated with friends in France and when I went to that country I asked them about recommending the book to a French



publisher and translating it for him. But I never seemed to get far with the project.

The French men of science are very fertile in original ideas and it seemed to me that they had an inherent dislike to seeing a foreigner's work translated into their language and published in their country. I have often noted that in the publication of their researches or of their advanced text books the references they give are generally to the work of their own country-men.

At any rate I was not successful.

After this I wrote to a scholarly friend in Montreal, a distinguished R.A.S.C. amateur, to ask if he could undertake the translation and assist in finding a publisher, but he was not able to help me.

Sometime after the Centre of the R.A.S.C. in Quebec City was organized I wrote to Paul H. Nadeau, its very active and capable secretary. I offered to supply the material for the illustrations and to allow all the profits to go to the Centre if it would secure the publication of the book. This met with the approval of my friends, and Mr. Nadeau entered on the task of making the translation. As soon as the drawings and photographs were received from Madrid they were dispatched to Quebec. I understood that arrangements had been made with a publisher, but just when Notre Univers Merveilleux will be ready I do not know. I hope that it will not be long delayed.

(Dec. 23, 1950)







XVIII Solar Conference, 19101. The reason for the TripFinished Jan 24  
1951 36th

When, in September 1907, I was leaving California, after a fruitful summer at the Lick Observatory, I wondered when I should have the good fortune to return to the Pacific coast. In three years the unexpected opportunity came.

Hale and American Astronomy

Astronomy in the United States owes much to George Ellery Hale. He was born in Chicago, June 29, 1868, and graduated from the M.I.T. in 1890. He established the Kenwood Observatory at his home in 1888, and at it invented and used the spectroheliograph, by which the sun is photographed in light of a single wave-length. He carried on research at Harvard Observatory in 1889-90 and at the University of Berlin in 1893-94. Through his initiative and his persuasive ability Charles T. Yerkes presented to the University of Chicago, in October 1897, the Yerkes Observatory, with its still unequalled 40-inch refracting telescope.

The observatory was located at Williams Bay in Wisconsin about seventy miles northwest of Chicago. Hale found that this was not a good site for solar research, and, as an off shoot of the Yerkes Observatory, a solar observatory was established on the summit of Mount Wilson in southern California, at an elevation of 5,700 ft. The Carnegie Institution of Washington was organized in 1902. It had a number of research divisions and it annexed the Mount Wilson Solar Observatory as one of them. The word "solar" was omitted from the name in 1918.



I used to think that Hale was too impulsive or rather inconstant, as he dropped one big project to tackle another; but he certainly was a brilliant planner and organizer, and his kindly and helpful disposition carried him through his great undertakings, including the 100-inch and 200-inch telescopes. It was fortunate, too, that he could find the various skilled helpers who were able and anxious to produce the extraordinary objects he designed. The greatest of all telescopes appropriately bears the name of Hale.

#### Co-operation in Solar Research

Hale was very active in organizing the International Union for Co-operation in Solar Research.

First, he addressed a circular letter to a number of men of science asking their views on the matter. All the replies were favourable to such a union. Action was then taken through various societies and academies, and a general meeting was held in connection with the International Congress of Science convened at the time of the St. Louis Exposition in 1904. At this meeting there were present 16 delegates, representing 14 societies and 9 distinct countries. The next Conference was held in Oxford, England, Sept. 27-29, 1905. There were in attendance 22 elected delegates and 18 other scientists. The Constitution of the Union was formally adopted at that meeting. The Union consists of scientific bodies interested in the progress of solar research, each constituent body acting through a committee nominated for that purpose. Each member of this committee is a member of the Union. The third Conference was held at the Astrophysical Observatory at Meudon (near Paris) May 20-24, <sup>1907</sup>, with an attendance of



77, representing 13 countries. The reports presented then showed very real progress in the tasks which had been assigned to various members. There was genuine co-operation.

The fourth Conference was held on the summit of Mount Wilson, at the great solar observatory of the Carnegie Institution of Washington, from Aug. 31, to Sept. 2, 1910.

Acting on a suggestion by Professor Hale that Canada be represented in the Union, the Council of the Royal Astronomical Society of Canada applied for membership. The application was supported by the National Academy (of the U.S.A.) and the Royal Society (of London) and was unanimously approved. The Bologna Royal Academy of Science was also elected a constituent society. That brought the number of member-societies up to twenty-two.

At this Conference there were 83 members present, made up as follows: United States, 46; France 9; Germany 9; Great Britain, 8; Russia, 3; Canada 2; Austria, Holland, Italy, Spain, Sweden and Switzerland, one each.

Among those in attendance were practically all the great astrophysicists of Europe. Hale was very anxious to have them visit his great observatory; and, I understand, he was able to persuade Mr. Carnegie to pay the transportation expenses of most of them.

John S. Plaskett, of the Dominion Observatory, Ottawa, and I were the delegates from Canada.

## II The Journey to California

On my previous trip across the continent I went alone, but on this one I insisted that my wife should be with me. She



hesitated; she could not leave the children! But it was arranged that Etta (15) should go to Muskoka with her Aunt Margaret Hamilton, while Bessie (11) and Jim (9) would stay with my parents at Unionville.

My elder sister, Mrs. D.D. Ross, lived with her family of boys and girls on a farm 12 miles S.W. from Souris, Man.; my wife's sister had married Dr. T.H. Whitelaw, a class-mate and room-mate of mine in the Arts course, and now M.O.H. for Edmonton; and spread all across the western provinces were college friends who were giving to the country devoted and able service in the various branches of life.

So it was arranged that we should travel by C.P.R. across Canada to Vancouver, call on our friends on the way, and then go south to Pasadena, Cal., visiting relatives in Washington State on a side trip from Portland, Oregon.

My younger sister Amelia, a graduate nurse, also wished to visit her sister, and she would go with us to Manitoba.

#### Owen Sound and Lake Superior

On Saturday, July 16, we found ourselves at the Union Station in the midst of a big out-going midsummer crowd. We boarded our train, which left at 1:00<sup>p.m.</sup>, ten minutes late. It was a long train drawn by two engines, and we reached Owen Sound (128 mi.) at 5:15. We got aboard the fine ship Assiniboia, on which we had secured good accommodation. The rain which had accompanied us had ceased and the sky was clear. We sat on the top deck or at the stern until ten o'clock and then retired.

On looking out next morning (Sun., July 17) I saw that we were entering the St. Mary River and big freighters were all



around us. After breakfast at 8:00 we sat in the sunshine on the upper deck as we ascended the river to Sault Ste. Marie, which we reached at 11:15. We came to the Canadain Lock at 12:00 and had lunch as we were passing through it. On entering and on leaving the lock I noticed that our big ship had a very hoarse voice. All afternoon we pushed against a head wind, but by next morning we had reached Fort William. Here we changed to the comfortable seats of a railway coach, and as the weather was warm and oppressive we raised the windows—and consequently got very dusty. The air-conditioned coach had not appeared at that time.

#### Winnipeg and Souris

We reached Winnipeg (420 mi.) at 10:15 p.m. (Monday) and found the city crowded with people attending the annual Exhibition. The hotels were full of visitors and it was hard to find a vacancy. At last I managed to get a room in the Royal Alexandra for the two women, and I, along with 35 others slept on a cot in the ball-room.

In the morning we viewed the city from the street railway. In the afternoon Jean and I called on a former student, W.C. Jaques, '04 M.& P., of the staff of the Dominion Observatory. In the evening my party went for a walk on the grounds of the Agricultural College, noting especially the Main Building and Roblin Hall; and we also called at Jaques's station where he was observing for latitude and longitude.

I slept in the ball-room the second night. Of course I had to use the general washroom and there, for the first time in my life, I saw a cockroach!



After breakfast we stepped across to the C.P. Station and left at 9:20 for Souris (151 mi.) which we reached at 3:10 p.m. My sister and her husband Donald Ross met us there with two buggies. Donald and I took one, and the three women the other. We got to the farm at 6 o'clock (Wed. July 20) all well!

For the next five days life was easy. The farm consisted of three-quarters of a section or 480 acres. One of the interesting sights was the ploughing by the two boys, Roy (17) and Arthur (11), each with a gang-plow drawn by five horses. "Art" was a little fellow to handle five horses and a gang-plow, but he liked it and took pride in doing a man's job. One afternoon Donald took Jean and me for a drive over the northern quarter-section. The crop was poor on account of summer frosts and lack of rain. While driving along the hard-beaten trail we ran into a big heap of dirt. This I was told was from a badger-hole. This animal seemed to choose the hardest ground through which to dig his burrow.

It was also interesting to see the old cat, day after day, bring in the gophers which she had captured. She would begin to eat them "by the head" and would try to get the kittens to join in the feast.

At one o'clock on Monday, July 25, Rilla, Jean and I started to drive to the station. The day was cool, there was no dust, and Tommy trotted steadily along and landed us in Souris in two hours. We left at 15.20 ( At that time the C.P.R. used the 24 hour system in the west.) We arrived at Arcola (102 mi) at 19:20 C.T. and departed at 18.40 M.T. Before reaching Arcola there are hills to the N.W. which rested the eye somewhat; and looking



out of the window I was pleased to see Capella near the northern horizon. The glow of the sky along the N.W. and N. horizon lasted until after 10 o'clock.

Regina, Calgary, Edmonton

The train reached Regina at 10.40, and Norman Mc Murchy of the Class of '90, a teacher of science in the Collegiate Institute, met us at the station and conducted us <sup>to</sup> the King's Hotel.

Next morning the same friend showed us a part of the city. We went through the City Hall and had a view from its roof. The Public Library was temporarily housed in it until a Carnegie building <sup>could</sup> be secured. Among the books I noticed "The American Natural History" by W.T. Hornaday. A few years before this, Hornaday had given an admirable lecture at the University of Toronto on the Rocky Mountain Sheep and I obtained a copy of his excellent book soon after. The children found it a real treasure. We also inspected the fine new Collegiate Institute building, which still lacked some furnishings. It was costing \$130,000, a sum ample for its purpose in 1910. There were many high school teachers in the city at this time, largely I believe in connection with Departmental Examinations, and I was happy to be among them.

At 2.15 p.m. we were taken for a motor-drive by Sheriff Cook with Police Magistrate Trant accompanying us. The Sheriff had the reputation of being a fast driver, but high speed at this time seldom exceeded 20 m.p.h. Further, we had the P.M. to befriend us. We saw the Parliament Buildings in course of construction, the Lieut. Governor's house, and the headquarters of the R.N.W.M.P.



Also we were shown the place where Louis Riel was hanged on Nov. 16, 1885. I remembered the occasion well. I had followed the course of the rebellion and was astonished at the disturbance amongst the politicians caused by the execution of its ringleader.

In the evening I lectured in the Assembly Room of the Collegiate Institute to a fine audience. My subject was the familiar one, the Universe of Stars, which was illustrated by a package of slides which I had with me. I also discussed the Regina Centre of the R.A.S.C., and stated that in the autumn it would be formally constituted.

Our visit to Regina was very pleasant; we boarded the train at 12.30 (midnight) to continue our journey westward.

For a long way the country was level and we sped forward, but as we approached Calgary hills to the north and the south gave variety to the landscape. At Medicine Hat (299 mi.) we <sup>also was bound for Calgary. Some years before this I</sup> stayed 20 min. and I met J.G. Taylor, '96 M.&P., who <sup>had</sup> lectured in Windsor, Ont., where Taylor then taught mathematics in the big Collegiate Institute. Next day, with him as guide, <sup>had</sup> I paid my first visit to Detroit. Like so many others, he had come to the west. Later he went to Edmonton. The train reached Calgary (475 mi.) at 5.35 p.m., on time; and at once we took the bus for the Queen's Hotel.

Here we were informed that there was a big rodeo show on in the evening, and of course we went to it. A big crowd, ten or twelve thousand people, had gathered in the Exhibition Grounds, but the show was pretty rough. The men raced on horseback, rode some "bucking" horses and roped some <sup>ee</sup> stiers. A hind leg of one



of the latter was broken and the police had to shoot the animal; and it was not done very expeditiously.

Next day (Thur., July 28) we "took in" the town by trolley, the system being owned and efficiently operated by the city. There were many fine buildings. When at the P.O. I met Dr. C.C. Hartman, of a well-known family in Aurora. He was M.B. '07, U. of T., and had taken lectures from me. He had come to settle in Alberta and was in town to write on his "Council" examination. This was another example of migration to the west. Then we called on F.S. Selwood, <sup>97</sup>'86 U. of T., who was in a law firm headed by W.A. Shortt, '80 U. of T., whose family lived near my wife's people in Toronto. Some of the educationists were out of town, but I met on the street Fetterly of Eastern Ontario, with whom I had read Departmental Examination papers in Toronto the year before.

At 3 p.m. we left Calgary for Edmonton (194 mi.). Taylor came to the station to say au revoir. On the train was Revell, the indispensable provincial bacteriologist at Edmonton and also Jeffers, the provincial architect, and the result was an agreeable trip. We reached our destination at 10.15. Dr. T.H. Whitelaw, who, as I have said, had married my wife's sister, Mary Laidlaw, and their young son met us in their McLaughlin car and we had a swift and bumpy ride home.

We spent six days in Edmonton. In it were many U. of T. graduates whom I was delighted to meet. They occupied a large number of important positions. Also, we had several interesting excursions to the surrounding country.



I was impressed with the recent improvements in the Isolation Hospital, the Exhibition Grounds, the new Collegiate Institute and several public schools. Over in Strathcona (across the river) the foundation for the main building of the University of Alberta had been laid and a dormitory was being constructed. The city was ambitious and prospering. Taxes were levied on the land, not on the buildings, also on floor-space in business structures and on salaries.

On the second morning I went with Dr. 'Tom', the M.O.H., to see a scarlet fever patient not reported by the attending physician. It was a genuine case, and the inspector (with us) tacked up the card on the house.

One afternoon we visited the historic Fort Saskatchewan. At first we drove along the north shore of the river and called at the big Swift's packing plant, conducted under the name of Griffin. It was near the long curving G.T.P. trestle bridge. We crossed to the south side of the river on the very long and high C.N.R. bridge. On the way home we took the south shore road and at Clover Bar, some 12 miles east of Edmonton, we ate our lunch under the great G.T.P. bridge with its concrete piers towering 90 feet above us. We got home in good time, having travelled 48 miles in all, at a good speed -- often rising to 15 m.p.h.!

Another interesting excursion was by the flat-bottomed stern-wheeler "City of Edmonton". The boat was about 100 feet long and it was loaded to the limit. We went down stream until just beyond Clover Bar, perhaps 15 miles, and returned at slow speed as the current was strong. We reached home at 11 o'clock, but the



northern sky was still aglow in this high latitude of  $54^{\circ}$ .

I also inspected the power plant and the scheme for filtering the yellow river water for domestic use in the city. It was a "quick filter" and was able to supply four million gallons a day. The population of Edmonton in 1910 was about 30,000.

A portion of my time in Edmonton was occupied in revising printer's proof. A well-known text book on Physical Geography by G.K. Gilbert and A.P. Brigham was widely used in the United States and had been revised to make it better suited for Ontario schools. The last three chapters comprised an introduction to astronomy. A number of inaccuracies in this part had come to the knowledge of the text book committee of the Department of Education and I was asked to consult with them. The upshot was, I was requested to see Dr. Seath, the Chief Superintendent of Education. He asked me if I would undertake to re-write the three chapters. I agreed to do this, and the question of remuneration came up. I was willing to do it for \$50. — or for nothing. I was anxious to forward the teaching of astronomy and to serve the Department of Education. He noted that there were about 50 pages and suggested <sup>ed</sup> \$5 a page or \$250 for the job. Of course I acquiesced. The work was not quite finished before I left home and proofs had been sent to me on my journey. I gave them a final revision and put them in the post at Banff.

After early breakfast (Thur., Aug. 4) we drove across the river to Strathcona and checked our trunk to Banff, which is 82 mi. west of Calgary. On the train to Calgary I had an interesting talk with J.A. Smith, '04 U. of T., at this time a P.S. Inspector at



← Calgary. On the way to Banff the sky was overcast and a mist prevented a good view of the mountains which we were approaching. Banff was reached at 9.15 p.m. and we secured a good room at the Mount Royal Hotel. Awaking early next morning, I looked out at 5 o'clock upon the mountains on every side, but the view was only fair; and a little later rain began to fall and continued all day and into the night. It was the greatest rain in many months. We sat in the lobby of the hotel around a big fireplace, on which cordwood sticks were continually thrown, and read magazines, and talked.

At lunch a young man sat opposite me who was at my lecture in Regina. His name was E.L.Fuller of London, Ont., a former pupil of my friend F.W.Merchant. He was now principal of the High school in Arcola.

In the afternoon we drove to the Sulphur<sup>u</sup> Springs, an outstanding attraction of this place, and had a delightful bath. The temperature of the water is 98° F. —hot on getting in but very pleasant afterwards. The rain fell all the time but we had umbrellas over us and did not suffer! We did not drink deeply of the sulphurous water, but it was marvellous to see it pouring forth all the time. The Alpine Club had its camp on Sulphur Mountain, not far away.

I thought Banff had a wonderful setting. There were great mountains close by —Cascade, Tunnel, Rundel, Stony Squaw, Sulphur— and some of them not hard to climb. If we had been staying a week or two I should have climbed several.

There were many other notable things to see. In the Government Museum was an interesting collection of stuffed animals,



and in the zoo were living specimens of the native ones—badgers, foxes, coyotes, timber wolves, mountain lions, black and cinnamon bears, etc. The buffaloes in their enclosure allowed one to come quite near to them and I got a close-up photo which included a little calf sprawled out on the ground. The walk along the Bow River to the Falls was very pleasing.

Our visit to Banff impressed us greatly. There was a remarkable exhibition of magnificent scenery, but to me the majestic mountains were the greatest attraction of all.

On Monday, August 8, along with many others, we moved onward 34 miles to Laggan. A large number got off and apparently as many got on the train. We climbed into Brester's carriages and in about an hour arrived at the Chalet. It was a continuous climb of three miles, following the course of a brawling stream much of the way.

Our room had been reserved for us and into it we moved and left our belongings. Then, going out on the verandah, we saw the famous picture—Lake Louise in the Mountains. We thought it a gem. On the right, Mt. Whyte; on the left, Mt. Alexander; before us, Mt. Victoria, with a small glacier on it; and hosts of other peaks. The lake is about two miles long and three-quarters of a mile wide. Paths along the shore led up into the mountains, and Jean and I went for a walk before lunch. There was a steady climb and she could not go very far.

After lunch Fuller and I went along the right-hand path up to Mirror Lake and Lake Agnes, two fine little sheets of water, with snow at the level of the latter. I lay down and drank of it—clear and cool. Just here I saw a small bear climbing a tree.



Then we went forward, and before we stopped we reached a mountain peak about 9300 feet above sea level. The view from the top was beautiful. We could see the valley of the Bow for many miles, with Laggan station beside it.

Our time table was:

Left Chalet - - - - - 2.35 p.m.

Ar. Mirror L. & L. Agnes- - 3.50 "

Ar. Peak - - - - - 5.00 "

Left Peak - - - - - 5.10 "

Ar. Chalet- - - - - 6.10 "

After dinner as we sat on the verandah a sudden "blow-and-rain" storm came down from the mountains which swept ink-bottles and blotters off the tables in the writing-room. We sought shelter in the splendid rotunda.

I thought Lake Louise was exquisitely beautiful, but felt that the landscape artist was rather too much in evidence. There were too many cultivated flowers about-poppies and others. It reminded me of a sheet of water on a millionaire's big estate.

Back again to the station, twelve in a wagon, we went next morning. We checked our trunk to Vancouver, and boarded<sup>d</sup> No. 97 at 8 o'clock. The trip through the mountains was very wonderful. Glacier was reached at one o'clock and we thought the scenery here was the wildest and most picturesque of all. A tunnel through the mountain which then was under construction probably eliminated much of the hard-climbing of the steam engines.

We wished to pass through all the mountains on our route by daylight and so we left the well-filled train at Sicamous



at 6 p.m. We registered at the C.P.R. hotel which was then in course of reconstruction. Our room was smelly with fresh paint and we used candles on going to bed. The hotel overlooks Shuswap Lake.

Next morning at 8.30 we boarded No. 1 which was not so crowded. After skirting Shuswap Lake we reached the Thompson valley and followed it a long time. The canyon is wonderful-rocky, sandy, steep, wide and narrow in succession. We reached Vancouver at 10.30

Here we visited Stanley Park and admired its big trees and the profusion of growing things generally. I secured some good photographs of the Seven Sisters and other giants of the Park. Then at one o'clock we got aboard the steamer "Charmer" which delivered us in Victoria at 7 p.m. We took the bus to the Dominion Hotel which indeed all the passengers seemed to do. Next day we viewed the city well from an observation car. The men in charge seemed desirous of pleasing their patrons. At 5 p.m. we started for Seattle by the steamer Princess Charlotte, a fine and comfortable ship, and about 300 were on board. We reached Seattle at 9.30 p.m. Our baggage was examined expeditiously but with care, and we walked over to the N.P. station and secured good sleeping car accommodation to Portland. We left Seattle at 12.15 a.m. and reached Portland at 7.30 a.m. This pleasing city we explored during the day, and at 7 p.m. we took the "Soo-Spokane-Portland Flyer" which, I noticed, carried C.P.R. cars. It reached Walla Walla at 6.30 a.m. (Sun<sup>d</sup>, Aug. 14) two hours late --but early enough for us. In an ancient "hack" we drove to 615 Washington St. and received a cordial welcome from my cousin Clara, her husband George Snell and



her mother "Aunt Betsy" Parkes. They had changed little since 1907 when I visited them. We remained until Friday, Aug. 19.

George and I visited Whitman College and the Conservatory of Music. Mr. Bratton, the professor of mathematics and astronomy, expressed interest in the "M&P." course at Toronto and I gave him an outline of it.

On Wednesday, Aug. 17, we went by interurban car to Freewater (11 mi) to attend a Peach Day celebration. There was a fine display of fruit and also a table with heaps of ripe peaches on it which we were free to partake of without expense. There was also a baby show with about 20 entrants. Focussing my camera for the estimated distance, I held it up as high as I could and made an exposure. It turned out an excellent picture.

~~8~~ We were also conducted through the Penitentiary by a guard and the chaplain, and I bought a trinket cleverly made by an inmate (George Trent, No. 4396, serving a 30 year sentence). We were told that all the money from such sales was credited to the ones who made the articles. I hope interest was allowed on the deposits.

Then a neighbour, Mr. Loney, who possessed a Winton car, took us all for a two-hour drive about the town and out five miles to the school and college of the Second Adventists at College Place. We were favourably impressed with Walla Walla.

We were sorry to say good buy to our loving relatives whom we would never see again. We resumed our journey on the evening of Friday, Aug. 19. First, to Portland (245 mi.) which we reached at 9.45 next morning, and here we had to wait until 7.45 p.m.



It was in this city that we first ate at a cafeteria. At the Peerless we had lunch at a cost of 55c. for two, and at the St. Nicholas we had supper for 29 <sup>and</sup> 33 ~~7~~ 62c., with an orchestra thrown in. Both meals were quite satisfactory. On the train was a young man named Bettoli, an undergrad of the University of California in Agriculture. He had been working on a hop farm at Independence near Salem, the capital of Oregon, trying to eradicate the hop louse there. I presume he was successful. Thinking of <sup>M</sup>arquis wheat and other benefits conferred on agriculture by scientific research, it seems to me that they cannot be measured even in astronomical numbers!

We reached Oakland, Monday, Aug. 22 at 8.30 a.m., and crossed on the ferry to San Francisco, 718 miles from Portland.

During the morning we validated our tickets, admired Market Street and did some shopping in two of the big stores, —the Emporium and S.M.Woods. Later we had a trip on the Observation car. First we were shown the big buildings and heard of the great damage by the fire following the 1906 earthquake; then we went out to the Golden Gate and the Cliff House. I recall seeing a big brown seal spreading himself (or herself?) on the rocks and great numbers of young ones disporting on the beach.

At 5 p.m. we boarded the train for San Jose. It consisted of steel coaches and made the 50 miles in 85 min., including several stops. I never saw a train stop so quickly and gather speed so rapidly.

The St. James hotel was almost full of A.O.H. (Ancient Order of Hibernians) delegates to a big convention. I noted that our



yard-long R.R. tickets were stamped "A.O.H." Green badges were everywhere.

I found that since my visit in 1907 changes had been made in the transportation to the summit of Mount Hamilton. An automobile service was engaged to carry the mails. There was some doubt whether we could be accommodated in it, but on inquiry at the auto-garage in the morning I found there was room for us. The chauffeur, whose name was Eaton, called at the hotel at 8.30. There was one passenger in front and <sup>a</sup> lot of freight in behind, but we squeezed in, and on the way up we picked up another man who also sat in front. We stopped 15 min. at Smith Creek and halted 10 min. to clean out the oiler, but we reached the summit before 12 o'clock. The whole trip was an easy one, infinitely ahead of the old style. We were welcomed by Dr. R.G. Aitken, W.H. Wright and my recent student at the U. of T., R.K. Young. Also there were H.C. Wilson of Popular Astronomy and P.W. Merrill, a Fellow of the Lick Observatory, who was the postmaster.

We were honoured by being the guests of Dr. and Mrs. Aitken. Visitors to the Observatory just then were also Professors Küstner of Bonn and Hartmann of Göttingen. They, the senior men on the staff, and Jean and I met at Mrs. Campbell's to drink a cup of tea on the afternoon of Wed., Aug. 24; and on that evening the visitors from Germany, Dr. Campbell and Jean and I went up to the great dome where Dr. Aitken was in charge of the 36-inch refractor. We saw the Hercules Cluster, 70 Ophiuchi and some other double stars, including two newly discovered by Dr. Aitken.

On the morning of Thursday, Aug. 25, we walked up to Kepler peak to see the tanks, including some recently installed near the



gushing springs, from which every house on the summit was supplied with running water.

I had a talk with Bachmann, the machinist, who barely missed settling in Hamilton with the Westinghouse Company; and also with Odlin, the general helper, who at one time lived in Barrie, and later owned 960 acres near Calgary and now had been for some years on the summit, where he cut the people's hair and helped in many other ways.

On our last day on Mount Hamilton there were five visitors to the summit. They came in two automobiles. We said good bye to our kind friends and at 1.30 started down in the regular stage. The trip was pleasant and the motor made good time. We reached San Jose at 4 o'clock. In the evening we went to a genuine 'nickel movie' and it was quite creditable. The people were well-dressed and the pictures were interesting and unobjectionable.

We packed our trunk at the hotel again, ready to move on in the morning.

At 9.10 a.m. we left San Jose on the Limited Express, an excellent train. At first we went through the Santa Clara valley, where prunes and peaches were being dried in the sun. Farther on were great quantities of apples; and we also saw 10-mule teams drawing big loads of sugar-beets to the railway. At 6.15 we reached Santa Barbara and at 9.30, Los Angeles(423 mi., on time).

We had been advised to secure accommodation at "The Pembroke" on Hill Street. We soon located it and were able to engage a room. At this time (1910) there were many rooming hotels and made-over residences of good quality at very reasonable rates catering to the numerous visitors to Los Angeles.



In the morning we found that our landlady, Mrs. Purdy, was formerly a resident of Chatham, Ont., and was acquainted with friends of ours, including the family of Professor Cornish and Mrs. Richard Davidson. My cousing 'Haney' Parkes (whose mother and sister we had visited in Walla Walla) and his wife now lived in Los Angeles. We met them in the afternoon at Ocean Beach (20 miles of electric railway) and after taking a look at the very extensive amusement places at Ocean Park and Venice, with their bands, dancing halls, bathing houses and side-shows, we all returned to Los Angeles.

Next day (Sunday) in company with our friends, we went out to Westlake Park, a beautiful area covered with fine palms and semi-tropical plants, surrounding a small sheet of water. The visitors threw on the water biscuits and crusts of bread which the carp fought to get. They simply tumbled over each other and we could hear them fiercely sucking in the food. There was also swans, pelicans, ducks and some other aquatic birds I did not recognize.

Of course Los Angeles had the finest of the new cafeterias and our evening meal cost \$1.47 for the four of us. It was a revelation to us who had come from the tardy east. Indeed it was many years before there was a cafeteria in Toronto.

In the evening Jean and I went to the First Methodist Church and heard Rev. Charles E. Locke preach to an overflowing audience. He had just returned from his old home in Ohio and the great crowd welcomed him back. At the service the choir sang, "My old Kentucky Home", "Suwanee Ribber" and "Home, sweet Home".



### III The Mount Wilson Conference

We were now approaching the ultimate object of our long pilgrimage -- the Solar Conference on Mount Wilson. ~~By~~

On Monday, August 29, we went by electric railway to Pasadena -- a 32-minute trip--and occupied the room assigned to us in the Maryland Hotel. It was on the second floor, with mahogany furniture and everything elegant. Here I met J.S. Plaskett of Ottawa and hosts of others. Indeed in the next four days I met practically all the noted astrophysicists in the world!

The offices and the workshops of the Observatory are in Pasadena at the foot of Mount Wilson and they were open for our inspection. Here was a machine for polishing a mirror; it was making a 3-foot flat. Also there was the machine for making the 100-inch mirror and not far away was the big disk of glass from which the mirror was to be produced but which was considered unsatisfactory. It was 13 inches thick and had been cast from three pourings and weighed  $4\frac{1}{2}$  tons. It was dubbed the "3-layer cake". On account<sup>of</sup> the lack of homogeneity in the disk it was feared that a mirror made from it would not retain its exact shape if stood on its edge. Another disk had been ordered, to be somewhat thicker and to be cast at a single pouring; but three years had elapsed and it was not forthcoming and the old disk had to be used. It was ground and polished and then mounted in its cell in such a way that when the telescope was moved into any position, it did not suffer any appreciable distortion. Many important researches were



made with the 100-inch telescope in the succeeding years, and the success achieved with it led directly to the construction of the 200-inch telescope. Then we were shown the spectrograph mounted in a 30-foot well so that it would be at a constant temperature. Also, there was an electric furnace which used up to 100 amperes of current in order to produce similar effects to those observed, by the spectrosope, in the sun; and many other remarkable pieces of apparatus.

In the afternoon there was a garden party at Hermosa Villa, the charming home of Dr. and Mrs. Hale in Pasadena. Here was a distinguished gathering. Hale himself, though unwell, was on the lawn, receiving the guests along with Mrs. Hale.

All this was preliminary to the formal sessions of the Solar Conference on the summit, and at 8.15 next morning the procession up the mountain began. Some went on horseback and some walked up the old trail, but most of the delegates went by carriage on the new toll-road, which had been constructed for transporting heavy instruments and supplies, at a cost of some \$50,000. The elevation of the summit is only 5880 feet and the entire length of road was less than ten miles, but there were many steep portions and the width was only eight feet. The curves were very sharp and only a single span of horses could be used. The number in a carriage did not exceed six. In ours were: E.C. Pickering, W.W.Campbell, Fernando Sanford, Jean and I. The day was hot and the dust was deep and we had to stop many times to rest the horses. The hotel



had provided box lunches which we ate about noon. Finally we reached the top at 4.30 p.m.

After a general clean-up and a short rest the difficulty of the <sup>c</sup>ascent was forgotten. Following dinner at the hotel we sat about the verandah and became better acquainted. Some of us walked over to Look Out Point to view the lights in the valley below. It was a beautiful sight,--as though some patches of the Milky Way had been brought down to the surface of the earth. Almost directly down was Pasadena and a few miles over was Los Angeles while still farther west was a string of lights marking out the ocean shore.

The sessions of the Conference were held in the mornings. At the first one (Wed., Aug, 31) Professor Hale extended a hearty welcome to the astronomers and physicists who had gathered from all parts of Europe and America; and he expressed the view that the Solar Union was more useful for stimulating research by personal contact in meeting together and entering into discussion rather than by the presentation of formal papers or even by formal co-operation. He then briefly described the 150-foot tower telescope which was almost completed.

Various reports and resolutions were presented.

At 4 p.m. all met at the "Monastery" for afternoon tea. In the evening C.G. Abbot lectured on "The Solar Constant of Radiation", to measure which he has spent nearly all his life. After the lecture Jean and I had a look at M<sub>13</sub> with the 60-inch reflector which was in <sup>c</sup>charge of Ritchey, its designer and constructor. The cluster appeared more spread out than in the



36-inch refractor in which we had viewed it a week earlier.

The days continued warm and Jean and Madame Donit<sup>c</sup>ah, whose husband was on the staff of the University Observatory at St. Petersburg, Russia, went down to more comfortable conditions in Pasadena.

In the morning session on Thursday most of the time was taken up by H. Deslandres, of Me<sup>u</sup>ndon, who independently invented the spectroheliograph. He was determined that the English-speaking members should know this and he spoke in English. But his French accent was so pronounced that nobody, *even fellows* *Frenchmen?* could understand him.

In the afternoon there was another tea at the Monastery and I took some photographs. In one, Arthur Schuster, W.W. Campbell and John D. Hooker were sitting on a bench. The latter *at this time* was financing the 100-inch telescope. His chauffeur had driven him up the steep road. After the tea I made the ascent to the top of the 150-foot tower in a bucket drawn up by a hoisting engine. At the top the outlook was somewhat startling, and the rapid descent to the ground was equally so.

In the evening (of Thur., Sept. 1) J.C. Kapteyn of Groningen in Holland lectured on the star-drifting of stars of the Orion type, and although of a technical nature he made the subject interesting to everyone.

I went to bed at 10 o'clock, and at 1.45 a.m. I got up and stayed in the dome of the 60-inch reflector until 4.30 looking at Saturn and <sup>the</sup> Orion nebula. On the former, one could see a bluish polar cap and a yellowish band across the ball near the equator. Also, the crape ring was prominent, the shadow



of the ordinary ring could be seen on the crape ring, and the ball of the planet could be seen through it. The seeing was very fine, and Ritchey declared the definition to be exquisite.

On Friday there were sessions in both morning and afternoon until 4 p.m. In the latter session the unanimous opinion of the members was that the Union should include stellar research; and it was decided that the next meeting of the Union should be in Bonn, Germany, in 1913.

I went to bed early, intending to get up in the morning to see St. John photograph the spectrum of a sun-spot just after sunrise, but unexpectedly the sky was cloudy and at about 6 o'clock a light shower fell.

At 8 o'clock the journey down the mountain began. Our carriage was a tall tally-ho, but with only two horses. In it were seven delegates: Fr. Richard of San Jose; Fr. Cirera of Tortosa, Spain; F. Sanford of Palo Alto; H. Kayser, F. Küstner and P. Eversheim, all of Bonn; and myself.

We made better time going down but did not reach the Maryland until 12.05. I took lunch at 1.15 and at the same table were Fr. Richard, E.C. Pickering and my countryman Plaskett. The meetings in these little groups were very enjoyable.

Later in the afternoon I went for a walk. I found Pasadena a truly beautiful place, with its fine houses and its semi-tropical trees and shrubs. I was acquainted with hardly one-quarter of them.

The closing function of the Conference was an elaborate banquet at the Maryland Hotel, tendered by Professor and



Mrs. Hale to the delegates and those accompanying them. About 100 were present. The proceedings were quite informal, but the menu and the service were simply perfect and the conversation among the guests gathered round the small tables was very interesting and pleasant. Out of consideration for Professor Hale's indisposition there was no toast list. The tall and distinguished Professor Kayser, who occupied the chair, proposed the health of Prof. and Mrs. Hale. Said He: it would ordinarily be considered a great work for any person to organize one observatory of the first rank; but Professor Hale, while still a young man, had to his credit, the initiation and complete equipment of two of the greatest in the world.

~~E~~ To complete this record it should be said that Hale in 1928 presented <sup>to</sup> the General Education Board his arguments for the construction of a 200-inch telescope, and he was promised the funds to build it. He died at Pasadena on Feb. <sup>22</sup>, 1938, ten years before the telescope was completed.

The dinner broke up at 10.30 and at 10.45 I said good bye to my friends and went over to Los Angeles where I rejoined my wife Jean who had renounced the tent on the mountain <sup>in favour of a</sup> ~~for a~~ few days in the city with my cousin and his wife.

#### IV The Return Home

In the afternoon of Sunday, Sept. 4, we went to Eastlake Park to see a wonderful collection of cacti, shrubs and other forms of vegetation strange to us. There was a bandstand at the edge of the lake and many persons in small boats listening to the music.



At 7.10 p.m. we bade our cousins a regretful farewell and went to the station, where we definitely started on our homeward journey. We left at 8 o'clock on "The Lark".

San Francisco was reached at 9.30 next morning, on time. On the train were several astronomers, among them, Pickering, Wolfer, Schwartzschild, Fabry, most of whom got off at San Jose to visit the Lick Observatory.

At Oakland we boarded the Overland Limited which started eastward at 11.07. In 1907 I had travelled by the D. & R.G. and then by this train, and I wished wife Jean to see the noted places through which these lines pass. After we got out into the country the day was warm although it was cool enough in San Francisco. We reached Blue Canyon and the Snow Sheds just as darkness came on, and consequently the interesting scenery on the eastern flank of the Sierra Nevada mountains could not be well observed. We passed through Reno about 9.30. I noted that, of the buildings in it which were visible from the train, about two-thirds were saloons.

Next day, after crossing the Great Salt Lake Desert and then passing on the Lucin Cutoff over Great Salt Lake, we reached Ogden, Utah, at 2.10 p.m. This station we left on the D. & R.G. at 2.55 and we reached Salt Lake City an hour later. I noted the fine new station. As we alighted we were besieged by hotel porters but we eluded them. Jean had a slight attack of hay fever while crossing the awful Salt Lake desert.

We spent Sept. 7, her birthday (41), in the stronghold of the Mormons, and much of it we admired greatly. The jokes



offered by the fluent 'spouter' on the observation car were about the same as three years earlier. Then at 11.50 we attended the organ recital in the Tabernacle. This was very enjoyable, the most striking part of it being the effect produced by the vox humana stop.

I checked our trunk from Salt Lake City to Toronto, and at 7.10 p.m. we left for Denver.

On awaking next morning I found we were in the same old trouble —an hour behind time! Slowly we 'chugged' along with two engines until at about 2 p.m. we got to Tennessee Pass (10,240 ft. elev.) on the back-bone of the continent. Then we dropped one engine and began to descend.

In the morning we passed through the Grande River Canyon, sitting in an open observation car; and at about 6 p.m. a similar car was attached for us to view to better advantage the Royal Gorge. The scenery was wild and wonderful.

As we proceeded the train did not make-up time but lost more, and, to make matters worse, at about 9 p.m. the gas to light the car <sup>*failed and the car*</sup> had to be lighted by a train\$man's lantern at each end! Some of the passengers went to bed and others got off at Colorado Springs, but we stayed on and at last, at 1.25 a.m., 2 hours late, we reached Denver. At once we walked to the Oxford Hotel and we were able to obtain a room on the first flat. The weather was quite cool in the city, which is situated a mile above sea level, and I was glad to have my overcoat.

Next morning (Fri., Sept. 9) I went to the C.B.&Q. office to secure the sleeping car ticket which I had ordered when in



Salt Lake City; and somewhat later (as usual) we took the Observation Car and had a good view of the city. It has a wonderful location in the midst of the Rocky Mountains and has an abundance of charming scenery.

Then, in the afternoon we called upon William Henry Graham, '90 U. of T. He <sup>had</sup> lived in Toronto and we were close friends when undergraduates. Graham took the Modern Language course and became a high school teacher. After some years he went to Colorado for his health, and in Denver he conducted a Boys' School. We were very pleased to meet again. His wife, whose old home was in Petrolea, was just then returning from a visit to Ontario.

We left Denver on the 4.15 p.m. <sup>on the</sup> Burlington train.

In the morning our train was an hour and a half late, but we slowly gained time until at 4 p.m. we were only fifteen minutes behind. Then something went wrong with the air-brakes and we steadily fell behind. We landed in Chicago at 9.45 instead of 8.45.

It was a pleasing trip, however. In Iowa and Illinois we passed through almost a continuous corn-field. Hundreds of thousands of acres! Also, the grass was green, a great contrast to Colorado. We continually thought of "smiling fields", "pastures green" and other phrases associated with a rich harvest.

On arriving in Chicago we transferred to the Dearborn Station and were able to secure sleeping accommodation on the 11 p.m. train which we boarded at once. We reached Detroit at 7.30 a.m., and moved about this great city until 11.15, when we



had lunch. Then we started forward again at 12.20. The train was not a fast one but was very comfortable and we reached Toronto at 9.27 a.m., Sunday, September 11, seven minutes late.

We were glad to get to our Madison Avenue home again. This was our first long astronomical journey together.

(Finished Jan. 24, 1951)







XIX Solar Eclipse of June 8, 1918Choosing a Site

The path of totality of this eclipse came into being at sunrise near the island of Borodina, south of Japan, took a north-easterly course across the Pacific Ocean until it neared Alaska, and then turning somewhat to the south, entered the United States just north of the mouth of the Columbia River. Going onward in a south-easterly direction, it crossed the states of Washington, Oregon, Idaho, Wyoming, Colorado, Kansas, Oklahoma, Arkansas, Missouri, Alabama and Florida; and, continuing into the Atlantic Ocean, it left the earth at sunset near the Bahama Islands.

At the middle of the path, south of Alaska, where the eclipse occurred at local noon, the duration of the total phase was 2m. 23s. Upon arriving at the Pacific coast, at 2.55 P.S.T., the duration was 2m. 1s. and the altitude of the sun was  $50^{\circ}$ . Going farther east along the path, the duration of totality diminished and the altitude of the sun at the total phase decreased, until on leaving Florida, at 6.42 E.S.T. the duration was <sup>50 sec.</sup> ~~60 sec.~~ and the altitude about  $10^{\circ}$ . The entire time required by the moon's shadow to traverse its diagonal path from Pacific to Atlantic Ocean was 47 minutes.

The width of the path of totality of this eclipse was 70 miles at the Pacific coast, 58 at Denver and 44 at Florida. In selecting a site to observe the eclipse one would naturally choose a place on the centre line of the path and as far west as one could go. There the sun would be highest and the eclipse the longest. But afternoon skies in the western parts of the United States in



early June are very uncertain. There are many unexpected outbreaks of wind and rain. There were many astronomers distributed along the centre line and about half of them had cloudy skies.

Early in the year 1918 E.B. Frost and E.E. Barnard of Yerkes Observatory and F.H. Loud of Colorado College (at Colorado Springs) made a tour by motor in search of suitable sites in Colorado, and one suggested was near Matheson, a small village on the Rock Island Railway, 60 miles south-east from Denver and north-east from Colorado Springs. In this part of the country in early June the sky, while usually clear in the morning, has many clouds in the afternoon, especially in the west. Being farther from the mountains than Denver, I thought prospects for a clear sky would be better here. Moreover Denver was the largest city within the path of totality and numerous observers would congregate there.

The site chosen for observations near Matheson was the summit of a hill  $1\frac{1}{2}$  miles from the village. Its geographical position was: Long. 6h. 55m. 56s.; Lat.  $39^{\circ} 10'$ ; Elev. 6000 ft.(about).

Dr. Otto Klotz, the director of the Dominion Observatory at Ottawa, and I were asked <sup>by</sup> the Council of the Royal Astronomical Society of Canada to observe the eclipse on behalf of the Society. He went to Denver, where clouds intervened; I fared better at Matheson.

My apparatus consisted of a  $4\frac{1}{2}$ -inch Cooke refractor with a photo-visual objective of focal length 81.8 in.; and a polariscopic camera, in which a double-image prism was mounted in front of an objective of aperture one inch and focal length 36 inches. The apparatus was loaned by the Dominion Observatory at Ottawa.



As soon as possible application was made to the Government at Washington to have the apparatus enter the United States free of duty; and after some delay instructions were given to the Collector at Detroit to admit the goods free under bond. They were shipped on Tuesday, May 14, and through the personal interest taken in my expedition by the Agent of the Canadian Express at Toronto and the General Agent of the National Express at Detroit, the boxes containing the instruments went forward without delay and reached Matheson on Sunday the 19th. There Professor Loud took charge of them and placed them in safe storage.

It should be remembered that this was during the fourth year of the First World War, when transportation was difficult and military preparations were given precedence everywhere. I was pleased with the service I received.

#### The Trip To Colorado

There seemed to me a certain tenseness among the people and I experienced exceptional friendliness in travel.

I left Toronto on Tuesday, May 31. (my birthday) at 6 p.m. "Daylight" time. I went by way of Dundas, Brantford, Paris Junction, Woodstock, Ingersoll, and reached London at 9 O'clock; and after much shunting we went on and crossed the border at Sarnia.

Across the aisle from me was a young lady who I found came from Missouri. She had been visiting a Mr. Myer of 62 South Drive in Toronto who had lived in Missouri. She was on the way home to Kansas City and carried a beautiful bouquet of orchids which she entrusted to the porter at night.



At 8.30 in the morning we reached the Dearborn Station in Chicago. It was a very bustling place. My Missouri friend did not have to change stations as the Santa Fe left from that one, but I climbed into one of Mr. Parmalee's buses and with about ten others was taken over to the C.R.I. & P. station. Here I had breakfast (including the ever-present griddle-cakes), and after considerable waiting obtained a berth in the Pullman to Limon in Colorado. Every one seemed to be over-busy.

Just before my train pulled out my friend H.P. Mills of '08 U. of T. came in the car. He stayed on until suburban Englewood station was reached — at 10.23. At that time he was managing a manufacturing business which had gone on the rocks during the war. I promised to stop over on the way home.

At 11.10 we reached Joliet, 37 miles from Chicago, an important place with fine stone buildings, and there crossed the Des Plaines River.

When the conductors came round just after leaving Chicago one of them remarked that he had never heard of Madison, the station to which my ticket read!

At lunch at 12.45 this day I was surprised when the man across the table asked me to read the bill of fare to him; he said he could not see to read it; but I suspected he could not read it anyway, — an extraordinary state of affairs, I thought. When I was getting up I left a coin for the waiter, and the man called to me that I was leaving some of my money!



At 2 o'clock Moline was reached (179 mi.) Then came Rock Island, adjoining it, and then we crossed the Mississippi, certainly a noble, though dirty, river. I saw one stern<sup>w</sup>sheeler; it was crossing to the east bank. On the west, or Iowa, side was Davenport, an important town.

At 3.48 we reached Iowa City, on the Iowa River. I noted that much corn was grown about here and that the country was very flat.

The next large town was Des Moines, situated on the river of that name, which flows east and empties into the Mississippi at Keokuk. A few miles north of the city was Camp Dodge, which was said to contain 45,000 soldiers. Uniforms were much in evidence here.

Just near the railway I saw an original advertisement. Upon a large sign were painted pictures of a ram's head with spiral horns, apparently a Merino, which is noted for its fine wool; and a woman's skirt. Beneath was the inscription:

FROM SHEEP TO SHAPE

I learned that the man and woman opposite me had been to Allentown, Pa.<sup>Pa.</sup>, to see their 21-year old son before he should leave for overseas. Their name was Tubbo and their home was in Pasadena, Cal.

About 10 o'clock a fierce thunderstorm came up and rain continued for upwards of an hour. We crossed the Missouri from Council Bluffs, Ia.<sup>Ia.</sup>, to Omaha, Neb.<sup>Neb.</sup>, at about 11.30 p.m. (Sat.)



Next morning across the table at breakfast sat a graduate of the University of Nebraska, now at Omana for a medical course.

In Iowa, Nebraska, Kansas and other states I was impressed with the regularity of the planting of the corn. Evidently this crop was considered of outstanding importance and should be sown with precision according to a definite pattern.

8.15 a.m. At Clayton in Kansas there were many windmills pumping water for the village houses.

9.00. At Selden, 823 miles from Chicago, elevation 2834 feet above sea level.

9.16 Rexford. Saw harrowing with a team of mules near the station (Sunday).

9.40 Colby. 850 miles, elevation 3135 feet. A considerable town with fine business blocks and a splendid school on the most prominent site. Three Ford cars and one small Overland at the station. Best place in a long time. The country like Manitoba. Our course in Kansas was westward, not far from the northern boundary of the state, latitude  $40^{\circ}$ .

11.00 Goodland. It looked like its name — "good land". I admired its fine brick blocks and substantial dwellings. The country flat and windmills numerous.

11.39 a.m. Kanorado. 904 miles. In Kansas still but near the western boundary.

12.04 p.m. Burlington, Colorado. 916 miles, 4160 feet. At this place there was a great real estate boom. I had read about it in a Denver newspaper. My friend the medical student got off here. He aimed to earn money for his next session. He



had attended furnace and done other chores form room and board the previous year.

12.25. I saw what I thought was a fox in a field to the north of the railway, but, as it was gray rather than red, it may have been a coyote.

1.00. For lunch the chief item on the bill of fare was Catfish Steak and bacon. It recalled my childhood days and was delicious.

2.55. Arrived at Limon where I left the main line. After staying 20 minutes I took a branch which ran to Colorado Springs (56 miles).

4.00. Arrived at Matheson, 19 miles from Limon.

Distance from Toronto to Matheson, 1520 miles.

#### Matheson and Making Preparations

Two of the astronomers already at the site, Edison Pettit and Miss Hannah B. Steele, met me at the station and escorted me to the Commercial Hotel where I engaged a room -- No. 6 -- for my stay.

Then I walked the mile-and-a-half to the site chosen for observation. I found separate shanties erected to shelter two fairly extensive installations. I spoke of oilcloth which I had to cover my comparatively small telescope, and was told that rain need hardly be feared, but fierce and frequent winds might render any observations useless. So I decided at once to put up a wooden shelter.

I then went back to town and arranged with Clark, the proprietor of Hotel Mattison for meals -- 21 for \$6.30 -- and



had supper with the 'elect'.

Matheson was a sprawling place of about 100 inhabitants. The original Matheson house was there, surrounded by cottonwood trees within a wire-fence enclosure, but I did not get the date when it was built. At the railway station there was also a fine big cottonwood tree, but trees were scarce in the country. For good production the land had to be irrigated, and sometimes when I sat on the ground it was upon prickly cactus plants. The main street was about 150 feet wide, and I noticed four or five ~~wiegh~~ scales, for farm produce, I presume, and also for coal which was brought in from near Denver at a cost of \$7 a ton.

The proprietor of the Commercial Hotel was named Drown. Six years earlier he had come from the Ozark highlands in Missouri and he thought this was the best country yet. His young son, however, said he missed the trees. My room was to be 50 cents a day; for a 'transient' it would be "six bits". Drown assured me there were no bugs.

One of my first duties after getting settled was to write to my wife Jean, and while I was doing it a jackass brayed twice! Mrs. Drown told me that her husband had sold a "coming 3-year old " Jack for \$3000!

Very recently a new community church had been built in ~~Madison~~ <sup>the</sup> Matheson. Indeed the grounds about it had not yet been cleared up. From its outward appearance I concluded that the village carpenter was also the architect, but it was quite respectable and creditable. That Sunday evening a service was held in it.



This began when the people arrived there, and the preacher was 91-year old Grandpa Wriggle! One of the children from the hotel reached home from it about 9.30.

On Monday morning I ordered lumber for a shelter. One of the most useful men in Matheson was "Brother" Perkins, an Evangelical preacher, teamster and carpenter, who originally came from near Sarnia in Ontario. He had a lumber-wagon and immediately carted the boards out to the site, and with the assistance of "Tommy" Smith, who lived on a ranch some eight miles away, he soon had the shelter constructed and my boxes inside it. The bargain I made with the lumber dealer was that I should not saw the boards any more than was necessary and he would allow me half the cost when the material was returned. As a consequence the shanty had an unfinished look about it, but it was an effective protection from the wind.

I may say that by correspondence I had arranged to have three small cement piers placed in the ground to support the feet of the tripod of my telescope, and over these the shelter had been built. I mounted my telescope on these piers and began adjusting it on Monday afternoon. I did not finish this work then as I required sunlight to test the polariscope, and clouds covered the sky.

In the midst of my strenuous labours around the site I noticed that the sole of one of my boots was separating at the toe. I inquired for a shoemaker and was told that there was one named Reid who 'carpentered' in the daytime and 'cobbled' at night and on Sundays. He did the job for me for a dime.



On Tuesday afternoon F.H.Loud, his son Francis M. and Kenneth Hartley came from Colorado Springs by motor, bringing their apparatus; and shortly afterward a very heavy wind, rain and hail storm broke over the country and lasted for an hour and a half. I went back in the evening to see if any damage had been done to my outfit. There was none, but the prospects for Saturday afternoon were poor. We were living from day to day!

On Wednesday, June 5, the sky was clear at 11 a.m. and I proposed to knock off some of the roof-boards of my shelter to allow the sunlight to stream into my instruments, but I postponed it in order to make measurements of my boxes in order to get Perkins to make crates to go about them for protection when shipped by rail; and at noon the sky was cloudy once more. For fear of rain I covered up the apparatus with oilcloth again!

However, at about 4.30 p.m. the sun came out beautiful and clear. I knocked off some roof-boards and sawed off part of a side-board and soon got the polariscope in line with the telescope. To test it for focus I exposed two film-packs.

After supper I went back to the camp and developed my films in Morehouse's dark room. From them I was able to determine the correct focus for the polariscopic camera. Along with Prof. Morehouse, I did not get back home until 12.40 a.m. I felt that my two instruments were satisfactorily adjusted.

On this day Mr. and Mrs. P.F.Whisler, of Jacksonville, Ill., former students of Drake University, joined the party.



### Preparations for the Observations

There were four separate installations of apparatus. The most extensive was from the Washburn College Observatory, Topeka, Kans., in charge of Edison Pettit, then of that institution but later of Mount Wilson. He was assisted by Miss Hannah B. Steele, at ~~the~~ <sup>that</sup> time of the Yerkes Observatory, afterwards his wife (both able astronomers); Miss Vera M. Gushee, of Smith College Observatory; and F.F. Neal and Roy Owens, of Kansas.

With a lens of focal length 14 feet an image of the sun was formed on a 10 x 12 plate within a darkened room, and the plate was moved by clockwork in order to follow the motion of the sun; and to obtain some record of the sky in the neighbourhood of the sun a black round disk of the same size as the sun's image was placed over that image while several exposures were made, before and also after totality. Quite apart from these 'sky' pictures, six separate exposures of various lengths were made of the total phase. Some good negatives were obtained.

Besides this, the 'flash' spectrum was photographed with a single prism and a camera of focal length 24 <sup>707</sup> inches. Also, accurate readings of an aneroid barometer were taken before, during and after totality; <sup>it was found that</sup> there was little change, perhaps a slight rise. A recording thermometer was included in the equipment: during totality the temperature fell about  $3\frac{1}{2}^{\circ}\text{F}$ . Further, Pettit's party had a chronometer which they checked by time signals received at the railway station and which supplied time for all the observing parties.

Another large installation was from the Drake University,



Des Moines, Ia. D.W. Morehouse, of that institution had transported his 8 $\frac{1}{2}$ -inch Brashear refractor, together with a 5-inch photographic doublet mounted on its tube. With the assistance of Donald M. Smith, a recent graduate of Drake University, exposures of various lengths were made with these two instruments, and some excellent negatives were obtained.

The outfit from Colorado College, at Colorado Springs, which had been prepared by F. H. Loud, consisted of three cameras on a single mounting. Their lenses had focal lengths 11, 8 and 18 inches with apertures 1, 1 $\frac{1}{2}$  and 1  $\frac{1}{8}$  inches, respectively. The motion in R.A. to follow the sun was produced in a simple and satisfactory manner. Carefully sifted sand in a big tin can was allowed to run out of a small hole in the bottom and a heavy weight, placed on top of the sand, descended, within the required limits, slowly and uniformly. To this weight was attached a wire cable which, after passing over certain pulleys, was wound around the axis bearing the cameras and rotating them at the proper rate. Kenneth Hartley assisted in the handling of the apparatus. The object was to determine the extreme length of the coronal streamers and to search for any objects near the sun.

My apparatus I have already described. I was glad to have the assistance of Francis M. Loud. He handled the telescope and I the polariscope. Two days before the eclipse another son of Prof. Loud came to camp—Norman W. Loud, a third year Medical student at Harvard.

#### Rehearsing the Programme

By Thursday afternoon the arrangement of the apparatus was



complete enough for us to rehearse our programme. The chromometer was placed on an improvised table in a central position and electrical wires were led to operate signals at each equipment.

The proceedings were as follows. The moment for us to begin the actual observations was "second contact", which is the beginning of the total phase. Five minutes before that moment Mr. Whisler would call "Time!" and every one would get ready. Then Miss Gushee would watch for the appearance of the corona and on the first glimpse of it would shout "Go!" Immediately Whisler would count in <sup>a</sup> loud voice the seconds as ticked off by the chronometer, --one, two, three-- -- until the eclipse was over. In this way each observer could regulate the beginning and the duration of each of his exposures.

During the remaining days our rehearsals were repeated many times until at last we were able to go through the performance with precision.

On Friday, Charles C. Plitt, professor of Botany in the Baltimore City College, Baltimore, Md., joined us. He had come all the way from Baltimore to see the eclipse, having chosen Matheson as the most promising place. At this time, however, our hopes of success were very slight. Day after day, at the time for the total phase, the sky was covered with clouds, especially thick in the west; but learning that Colorado was the despair of the weather forecaster and that the condition of the sky could not be predicted five minutes in advance, we did not give up.

The computations of the times of contact for our station were supplied by Mr. Pettit, as follows:



## Daylight Mountain Time

|                |       |               |                |                  |                                      |
|----------------|-------|---------------|----------------|------------------|--------------------------------------|
| First Contact  | - - - | $\frac{h}{4}$ | $\frac{m}{13}$ | $\frac{s}{42.6}$ | when outer edges of sun & moon touch |
| Second Contact | - - - | 5             | 23             | 50.7             | beginning of totality                |
| Third Contact  | - - - | 5             | 25             | 19.2             | end of totality                      |
| Fourth Contact | - - - | 6             | 28             | 3.7              | outer edges touch again              |

The Observations of the Eclipse

Saturday, the day of the eclipse broke fine, and again our spirits rose, but by noon the ominous cumulus clouds appeared. At 2.30 p.m., "daylight" time, they became denser and the sky grew darker. Occasionally great cloud masses entirely obscured the sun. However, at 4.13 they thinned out sufficiently for first contact to be seen clearly. It was observed by Messrs. Pettit and Morehouse by projecting upon a sheet of paper the image of the sun produced through the 3-inch finder of the large refractor. Their observation made it 7.2 seconds later than the computed time. Like many others, I looked for it through smoked glass, but I could not detect it until 10 sec. after they had announced it. The second and third contacts were observed within one second of the computed times.

After first contact there was a wait of an hour for the total phase. Many people had come to our station from all directions, perhaps 100 automobiles being gathered on the hill. All continued to watch the thinning solar crescent and the thickening clouds. During this weary wait we were treated to a novel diversion. A hare appeared on the west face of our hill, and to the great amusement of the crowd three men on motorcycles attempted to run



it down. The nimble-footed animal circled about the field for almost ten minutes, and when nearly exhausted ran into a friendly ditch over which the machines could not pass.

At 5.18 Whisler called "Time!" though the sun could be seen only dimly through the clouds. Soon after this the darkness began to be felt, much as though a great thunderstorm was approaching. But, to our great joy, just as the bright solar crescent was about to disappear, the clouds parted as though curtains were rolled back, and the eclipsed sun was seen clearly! The "shadow bands" were very pronounced; through the cracks in our shelter Mr. Loud and I could see them sweeping past. Then Miss Gushee, catching sight of the corona, cried "Go!" and Mr. Whisler began to count. There was the silence of awe amongst the onlookers, and the astronomers were busy carrying out their programmes. During the exposures, usually of a few seconds, we gazed on the corona, but we had to keep a strict account of the passing seconds. At "86" the sunlight shot out from behind the moon and the eclipse was over! Then the crowd surged within the fenced-off enclosure and the hill became alive again.

The corona was clearly seen in all its beauty. At least three great prominences were visible to the naked eye. A great coronal streamer above the sun could be traced for at least two solar diameters (say 2,000,000 miles) while there were two somewhat <sup>h</sup>orter, though very prominent, ones below. An interesting feature of the eclipse was the sudden appearance of the planet Jupiter which "popped out" just to the east of the sun as totality was announced.



After totality the clouds promptly returned, and they gradually increased in density until, at 6.28, the time of the last contact, the position of the sun in the sky could hardly be detected at all.

Mr. Loud and I made our exposures according to schedule. A long one made with the telescope was much too long, but the others were satisfactory. Those with the polariscope were not so successful; it seemed impossible to get a clear sharp image with this instrument.

Professor Plitt observed Baily's Beads through the 3-inch finder of Morehouse's telescope. They made their appearance six seconds before totality was called. At least 25 were visible and they were yellowish in colour.

Donald Smith observed the "flash" spectrum with a small direct-vision spectroscope. He reported the reversal of the spectral lines (both at) second and third contacts.

Mrs. Whisler saw many "shadow bands" just before and after totality. They were black-and-white, one inch to one-and-a-quarter inch in width, <sup>and</sup> moved rapidly, like ripples on the surface of water.

In the village it was noted that when the light was returning after totality a rooster crowed; and up at the railway station, in the big cottonwood tree, the day birds ceased their song, while those of the night began to chirp.

On one or two evenings during the week Prof. Morehouse had allowed some visitors to the hill to view Saturn, the Cluster in Hercules and other celestial objects. This privilege seemed to be highly valued, and he announced that if Saturday evening should



be clear he would adapt his large telescope for visual observations and put it at the service of any who might come. The evening did become clear—as most of them did by 10 o'clock—and a large number of people were able to observe interesting bodies in the sky through this fine instrument. The chief objects were the planet Saturn, the Star Cluster M13 and the bright star Vega.

Morehouse and I were the principal showmen of the evening. The visitors were young and old, and one of the former was a maiden of about twelve, the daughter of the station agent. I pointed out to her the planet in the sky, told her of its distance and its size and about its wonderful rings—all this while some one else was looking through the telescope. Then he moved away and she stepped up on a box put there to make her high enough to look through the eyepiece. I got her to recognize the various features of the planet and she gazed intently at them. Then another took her place. Having finished with Saturn we took the Star Cluster; and this continued for over two hours. Then we closed up and visitors drove us back to the hotel. It was a fitting finale to the afternoon's performance.

#### Dismantling and Packing Up

Immediately after the eclipse I began to dismount my instruments, and after supper Brother Perkins drove Morehouse and me up to the hill in his "Chev." Before darkness came on I had made good progress in my packing up and Morehouse had prepared his beg telescope for the visitors who came in the evening in large numbers.

Next morning (Sunday) I went back to the hill, and by



10 o'clock I had completed the job. Whisler helped me to screw up the boxes and to put on the labels. I helped Morehouse with his packing. He and Smith intended to pull down his house, but I engaged Perkins to pull down mine and also to deliver my boxes to the express office. I may say that on the outward trip they were rushed to their destination within six days, but, when the urgency was over, they were upwards of a month on the return.

When on the hill this morning a Mr. Svesgard, who lived nearby, came to cart away a tank of water which he had taken up to the camp as a protection against fire. He claimed to be a prophet and as he was not very busy this Sabbath morning he talked to Professor Lowd for an hour on revelations and other subjects. Lowd afterwards propounded the conundrum: What is the difference between Pharaoh's Daughter and the Eclipse Expedition? One got a prophet from the water; the other got water from the prophet.

I did not go up to the summit in the afternoon, but had a rest and <sup>a good</sup> read of Thoreau's "Walden".

At 6.30 I looked out and saw that Pettit's shanty was pulled down.

[ Three little houses sitting on a hill,  
One was "took away", two were there still.

After supper, and having paid all the debts I had incurred, I walked over to the station accompanied by my friends Morehouse and Lowd and Smith. On the way we tried to identify the brighter stars which were just coming out in the dusk. There was one we did not recognize with certainty but thought it must be Altair.



At the station the agent C.D. Shafer, his wife and daughter were very friendly. The mother said that daughter Benedicta was much interested in what I had told her the night before and would like to go with me! I may say that I have sent her greetings at Christmas ever since. Not many years after the eclipse her father died and she moved with her mother to Denver. Later she married and now (Mrs. Vern Hutton) lives in Albuquerque, New Mexico ) [1950]

On the train from Matheson I occupied a *reclining chair*, the first in my life; and I reached Limon about 9.30, *and changed* to the through train. I asked for a berth and had to take "Upper 5". I thought, better be in upper 5 than in the 'submerged tenth'.

Next day on this train Astronomer F.C. Jordan of the Allegheny Observatory, who was returning from Denver to his home in Pittsburgh, Pa., asked me if I had seen the New Star in Aquilae. I was pleased that I could say I had, although we had not recognized its importance at the time, *on the way to the station.*

On Monday morning at 9.42 we were in Belleville, Kan., Beside the station there was a pleasing little park with green grass and box-elder and elm trees. At 3.05 p.m. we iced-up at the big Swift refrigerating plant, and during our stay there I got off to absorb some fresh air. In the station I saw a thermometer and it read 94° F.

### In Chicago

On Tuesday we reached Chicago at 8.30 a.m., an hour late! My friend Mills was at the station to meet me, to claim a week's visit!

We went to his place of business on N. Lincoln St., where some letters were awaiting me and I wrote some replies. As I was



unacquainted with the city streets, his secretary took me to the Marshall Field big store and turned me loose for the morning.

In the afternoon I visited the Art Institute and enjoyed the pictures. The two I liked best were by Corot. After this I went to the G.A.R. Exhibition in the Public Library Building. There were some interesting Civil War relics, especially those relating to the Illinois regiments. After dinner at 6.p.m. at the Stratford we rode in a motor bus east and north through the finest part of the city, and finally took the "elevated" to Oak Park to Mr. Mills's quarters. He occupied a room in a fine old mansion in the midst of beautiful grounds. Here I had a good talk, a good bath and then to bed in quiet surroundings.

After breakfast next morning I sat on the verandah and had a pleasant conversation with a Mr. Perry who lived across the street. He was interested in astronomy and wanted to hear about the eclipse. I learned that he had been a class-mate of Otto Klotz of Ottawa and R.S. Woodward of Columbia University, at the University of Michigan at Ann Arbor in 1872.

I called up R.R. Bensley, '89 U. of T., professor of Anatomy in the University of Chicago, to which he came in 1901 from the department of Biology in Toronto. He said he was leaving next morning to drive to Penetanguishene on his way to his summer cottage at Go Home Bay-which is just a quarter-mile from my own. I also got in touch with R.J. Bonner, professor of Classics at Chicago. Both he and his wife were classmates of my own at the U. of T., and they also had a cottage at Go Home Bay.

In the afternoon I went to the Field Museum, especially to see the splendid collection of Meteorites there and to call



on its curator, Dr. O.C. Farrington. At first he was not in his office and I inspected the many fine specimens they had. I was particularly pleased to see a sample of the Dhurmsala meteorite which fell in India on July 14, 1860. It came down in a wet place and when it was picked up it was coated with ice, demonstrating very neatly that when flying through space its interior temperature was below the freezing point. Before long Dr. Farrington returned to his office and I had an interesting conversation with him. He said a meteorite which fell near Colby, Wis., in 1917, was quite as remarkable. He got on the ground as soon as possible and from numerous witnesses he had been assured that there was frost on it when recovered. Actually it penetrated five feet into the clay when it fell.

Dr. Farrington came out of his office with me to look over the collection. He said some of the iron specimens could be cut with a hack-saw and some could be worked up into tools. There was a fine iron specimen from Texas weighing 1530 lbs. He said he cut off a corner of it with a saw and came nearly being arrested while doing it. The Museum gave \$1 a pound for the specimen afterwards. I was also much interested in the Canyon Diablo meteorites of which the Museum had an individual sample weighing half a ton.

After this I had an interview with A.A. Michelson the physicist. I was undertaking an experiment on the relative motion of the ether and surrounding matter. I had come to have a strong belief in the objective reality of the ether, and the experiments with Michelson's interferometer were fascinating but mysterious. I aimed to determine if the passage of a beam of light through an



electrolyte (silver nitrate) was altered when an electric current was passed through it, first in the same direction as the beam of light, and second, in the opposite direction. He was very cordial and thought my proposed research was feasible and important, but he feared that as in so many ether experiments, the result might be negative. As a matter of fact the experiment turned out extremely difficult and I was never able to complete it.

Then my friend Bonner showed me about the University and I went home with him. I may say that Mrs. Bonner during the long years she lived near the University became a sort of adoptive mother to the Canadian students at the University of Chicago. Both Mr. and Mrs. Bonner (Annie <sup>Willson</sup> Willson) came from near Ridgetown, in the county of Kent, Ontario. They were guests at my home at the Dunlap Observatory on the occasion of the 50th anniversary of the Class of '90 in 1940. He died, Jan. 23, 1946; she, June 18, 1949.

On Thursday I paid a visit to Lincoln Park and to the Chicago Academy of Sciences building in it. I wished especially to see the model celestial sphere which W.W. Atwood had designed when he was in charge of the Museum. It was constructed by the chairman of the Board of Directors. It was made from sheets of metal which had been pressed into spherical curvature and soldered together to form a sphere 15 feet in diameter which was mounted so that it could be rotated about an axis parallel to the axis of the earth. The lower part of the sphere, surrounding the south pole, was cut away so that a person might enter it and stand on a platform while the sphere rotated about him. Through the metal



sheets forming the sphere holes were drilled in the proper places to represent the distribution of the stars on the sky and having sizes proportional to the brightness of the stars. The sphere was in a room of its own which was illuminated by electric lamps. Their light passed through the holes and when the sphere was rotated by a motor <sup>it</sup> <sub>it</sub> faithfully represented the motion of the starry sky.

When I arrived the room containing the sphere was not open. I applied to Charles F. Hills, the secretary, and he sent one of the staff to demonstrate it for me. There were many other exhibits, many of an educational nature but the sphere pleased me greatly. It was, I believe, the most effective planetarium then in existence.

At the G.T.R. station I met L.V. Redman, a close friend of H.P. Mills. He was the inventor of a plastic called <sup>redmanol</sup> ~~red-manal~~ and was being prosecuted for infringement of patent by Baekeland, the inventor of bakelite. Redman assured me he had no fear of the result. Actually, before the case came to trial the two companies amalgamated. The use of plastics has grown enormously since 1918 and has not yet reached its limit (1951). Redman afterwards lived 15 miles west of Hamilton and visited me at the Observatory. He died Nov. 25, 1946; age 65.

On the train bound for Toronto was my long-time friend Col. H.A. Bruce. He graduated in Medicine in 1892 and I knew him as a distinguished student. Just 30 days earlier he had, as a high officer, visited the French front. He was now returning home, for a short visit, from the American Medical Association in Chicago.



Then he was going to Boston, Cincinnati and other places.

Seventeen years later, on May 31, 1935, I had a happy meeting with Dr. Bruce again: he was <sup>now</sup> Lieut. Gov. of Ontario and I walked with him to the platform at the official opening of the David Dunlap Observatory.

I reached Toronto at 9.10 a.m. on time! Half an hour later I was with my family on Madison Avenue.

February 19, 1951



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## XX The Australian Eclips of 1922

### 1. Reason for the Expedition

A total eclipse of the sun is always interesting and is scientifically important, besides being the most spectacular of astronomical phenomena. The Australian eclipse of 1922 was of special interest through its connection with the Einstein Theory.

#### Advance in science: facts and theory

Science advances in two ways: (1) by discovery of new facts, and (2) by imagining systems or mechanisms which 'explain' or 'account for' the facts already known, and allow us to predict further facts or phenomena. The human mind is so constituted that it is not satisfied until it can assign the causes of the facts or of the phenomena which it recognizes or accepts as real.

We all agree that light passes from a bright body in the sky, such as the sun, to the earth; or from a candle at the far side of a darkened room to a sheet of paper in your hand and thence into your eye. Just how does it do this? By what sort of mechanism does it travel from one place to another?

During the nineteenth century evidence accumulated that light was transmitted or propagated<sup>a</sup> by wave motion; but waves require a medium to travel in, and to that medium, in this case was given the name, the luminiferous ether, or simply the ether. At once it seemed evident that the ether must fill all the space between the bodies of the material universe, and even between the ultimate particles composing those bodies. It was thought that the ether passed amongst the particles of a material body as freely as



the wind passes through a forest. The earth, then, in its motion would sweep through the ether, but apparently without hindrance.

Now very delicate experiments to detect the relative motion of the earth and the ether were devised and performed, but always with a negative result. What was the matter? Where was the flaw in our reasoning? It was boldly asserted that the error lay in our basic ideas of space and time. We had treated these concepts as entirely independent of each other, as if there was such a thing as absolute time and as absolute space, whereas neither can exist without the other. This method of solving our difficulties appeared very much like pushing the problem which was puzzling us from the realm of physics into the realm of metaphysics. Indeed we have a fashion of doing this when in our theories we reach a point beyond which we cannot pass.

### Einstein's Theory of Relativity

In 1905 Einstein, who was then professor of theoretical physics in the University of Berne, published his "Special Theory of Relativity", which was followed in 1916 by his "Theory of General Relativity". His line of reasoning in establishing the basis of his theory is not easy to understand; but having fully formulated it he made three deductions or predictions from it. One of these was that a ray of light coming from a distant star, upon passing near a massive body, would be deflected from its straight-line course. In the case of the sun, the ray passing close to its limb would be bent through the small angle  $1''.745$ .

Now this prediction could be tested at a total eclipse of the sun. Though the First World War was not concluded, expeditions

← Encke's Orbit

1.75



were sent from the Universities of Oxford and Cambridge to make observations at the eclipse of May 29, 1919, for this very purpose. The result was an apparent verification of Einstein's prediction. But the predicted amount of the bending was extremely small and the measurements were very difficult to make, so that the results were not decisive. Further observations were very desirable.

The next suitable eclipse for this purpose would occur on Sept. 21, 1922, and its path of totality was across the wide continent of Australia. Director W.W. Campbell of the Lick Observatory, an experienced and competent observer of eclipses, decided to send an expedition to observe this eclipse for the express purpose of obtaining evidence on the Einstein Theory. I asked him if I might prepare apparatus and accompany him and he was cordially agreeable. This led to one of the greatest experiences of my life.

#### The Apparatus Required

The chief instrument I required was an astronomical camera. I ordered a "photographic doublet" of 6-inch aperture and focal length 11 feet from Brashear of Pittsburgh. The body of the camera was a lattice tube of square section constructed from strip-and-angle-iron and covered with light-tight black cloth. The plate-holders were to be of metal, to hold a 11 x 14 plate. The order for the tube and the plate-holders was given to a Toronto firm. The mounting, which I designed was of wood, of the yoke-type, somewhat like that of the 100-inch telescope on Mount Wilson. It was made in the University of Toronto workshop and seemed simple and rigid. A good driving clock was ordered from Cooke in England. The whole construction was of a somewhat temporary nature so that



it could be taken to pieces easily for shipment, and yet it was rigid when set up. Following Dr. Campbell's example, I ordered special plates from the Eastm<sup>a</sup>en Company with the emulsion on ~~the~~ plate glass.

Further, I was interested in investigating the polarized light in the sun's corona and secured a suitable Nicol prism to be used with an ordinary type of camera.

The preparation of this apparatus <sup>v</sup>gave me much labour and anxiety.

In my party I intended to have my wife and my daughter Elizabeth and we proposed to leave Toronto early in June. As time passed I felt the need of a competent assistant, and a month before the time of departure I sent a night letter to R.K. Young of the Dominion Astro<sup>h</sup>ysical Observatory at Victoria, B.C., asking him if he would be a member of my expedition. To my great relief and joy, he was willing and able to accept my invitation. He would join us at Victoria.

In the meantime I learned that the Australian Government had offered to bear the expense of transportation of our party while in Australia and would also send a company of nine men under a naval commander to assist in establishing and managing our camp. The site chosen for our observations was at Wallal, on the north-west coast, just within the Tropic of Capricorn; to reach it would involve a long journey, full of new scenes and interesting incidents.

From Toronto we should go, first to Winnipeg, Edmonton, Vancouver, Victoria; then by ship to Honolulu, Fiji, Auckland,

Fiji



*Sydney, N.S.W.;*  
 N.Z., next, by railway to Melbourne, Vic; Adelaide, S.A., and  
 across the desert to Perth and Fremantle, W.A.; thence by ship  
 along the west coast to Broome, and finally back to Wallal.

At this eclipse we proposed to photograph the sun when the moon was directly in front of its disk, and to give long-enough exposures to record on our plates a number of stars in the sky in the neighbourhood<sup>h</sup> of the sun; and to complete the observations we required to have photographs of the same star-field taken with the same camera when the sun and the moon were away from that part of the sky. Those of course could be obtained by going to the site of observation of the eclipse about three months before its date or remaining there for about three months after that date, and making the exposures at night. It is evident that in the case of this eclipse neither of these proposals were desirable. But the required photographs could be taken<sup>also</sup> at any point on the earth's surface in the same latitude as that of the site chosen for observing the eclipse. Now Tahiti is so situated, and Dr. R.J. Trumpler of the Lick party was going to that place in the month of May to secure photographs of the star-field with the Lick cameras, and he very generously agreed to do the same with my camera if I would send it to him. So I shipped the tube and lens and plates in six packing<sup>cases</sup> mounting. He secured the comparison plates early in June. Then he went on the Sydney and waited for the rest of us to come.

I had secured passage for my party on the ship scheduled to sail from Victoria, B.C., on June 17, and of course wished the balance of my apparatus to go on the same vessel. It was



packed in nine strong cases made in the University carpenter shop. Dr. Campbell had asked that they be not too large nor any to weigh over 200 pounds. They were painted blue and addressed to myself at Sydney, N.S.W., with full instructions spread over them. They were delivered to the C.N.R. freight shed in the last week in May.

We had decided to leave Toronto on June 7, and to satisfy myself about the apparatus, I went down to the Foreign Freight Office a few days before that date, to inquire about my shipment. In a few minutes I was informed that it was being carried in C.N.R. Car 402 002, with W/B 119 574 and B/L 1444; that the car had left Toronto on May 26 and was then within B.C. I thought that was a good example of efficiency and my mind was at ease.

( May 20, 1951 )



## 2. Across the Continent by Canadian National Railways

After a strenuous day (Wednesday, June 7, 1922) making final preparations, our good friends, Prof. and Mrs. A.E. Lang, took us down to the Union Station in their automobile. We boarded the Continental Limited train No. 3 at 10.15 and started out at 10.35. Only a few weeks earlier had the Canadian Northern, the Grand Trunk Pacific, the old Grand Trunk and other railways been consolidated and re-organized into the Canadian National Railway System and this was my first trip on it. My family occupied section 5 of Pullman Sydenham. The day had been hot and the night was the same. The moon was nearly full and from the observation car Fort Garry at the rear I watched our route as we moved rather deliberately through the devious Don valley until at last the train got well beyond the city when it gathered speed. Then I "turned in" and soon fell asleep.

### McVitties, Stupart, Palomar

Next morning the first station seen was McVitties (240 mi.), four miles beyond Burwash, well known for the provincial Industrial Farm near by. At St. Cloud (249 mi.) we crossed train No. 4 at 8:20 a.m. Then we reached Sudbury Junction (262 mi.) and after this Capreol. That name was familiar to me, being the name of a well-known Ontario civil servant. The town itself evidently owed its importance to the railway. I looked in the telegraph building and was astonished at the extraordinary collection of instruments. It was a repeating station for <sup>the</sup> Toronto and Montreal lines.



12.10

At 12.10 p.m., mileage 335, altitude 1315 feet above sea-level, I saw a sign bearing the name Stupart, but there was no station in sight. However there was a very useful siding. It recalled Sir Frederic Stupart, a friend of many years standing. He was born in Aurora, Oct. 24, 1857, and died in Toronto, Sept. 27, 1940. At the age of 15 he became a permanent member of the staff of the Toronto Magnetic Observatory (on the University grounds). Also, the very first public storm warning in Canada was issued by him on Sept. 4, 1876. He well deserved commemoration.

At Foleyet (3.00 p.m., 424 mi., 1078 ft.), which was a divisional point, a fresh engine was put on. Here I saw an Indian girl with a papoose on her back. I also noted evidence of a great flood on the piles of railway ties near the saw mill.

Not until many years afterwards did I notice that the second station east of Folyeet was named Palomar (414 mi.) which is the name of the mountain in California on which the 200-inch telescope is mounted. 'Palomar' in the Spanish language means 'pigeon-house' or 'dovecot'; I suppose one might expect to find such in Ontario as well as <sup>in</sup> California.

At Argolis (5.27 p.m., 490 mi., 1035 ft.) there was a sign and a siding. As the night came on we continued westward, with few stops, the chief ones being Oba (534 mi.) Hornepayne (573 mi.) and Longlac (674 mi.)

At the latter place the road turns abruptly south-west, and 90 miles later it reaches Lake Superior and follows along its rugged shore until Port Arthur and Fort William are reached. In



this 200-mile stretch between Longlac and Port Arthur there are some well-known stations, including Hardrock, Geraldton, Jellicoe, Orient Bay, Cameron Falls and Nipigon.

#### Head of the Lakes and Minnesota

Friday morning, June 9, Port Arthur (871 mi), ar. 7.30 E.T., lv. half an hour later, 6.50 C.T. <sup>^</sup>Fort William is only three miles farther west. The "head of the lakes" is certainly notable for its great elevators and many steamships.

For some time we followed the Kamistiquia River, which seemed nearly full of logs. The route now straightened out and ran more nearly west, not far from the boundary between Ontario and Minnesota.

At 2.30 p.m. a passenger got off at Rocky Inlet (1093 mi.), apparently going to a big lumber mill on Rainy Lake.

I thought Fort Francis (1103 mi.) was a good-looking town; it was reached at 2.45 p.m. At Rainy River station (1158 mi.) the Rainy River was reached and the train crossed it on an iron bridge to Baudette in Minnesota. The doors of the cars were now locked until the number of passengers could be counted. The train speeded along through Minnesota, south of the Lake of the Woods, at 45 miles per hour, and the last station in Minnesota was Warroad, 37 miles from Baudette. Now we got back into Canada, but in the province of Manitoba. Immediately the direction of our route was changed to north-west, and after travelling 112 miles over level country we came at 9.15 p.m. to Winnipeg, 1309 miles from Toronto by this interesting route.

At this capital city, then with a population of 180,000, we changed cars but were still on the Continental Limited. We ob-



I  
 tained section 3 in the sleeping car Jonquiere, and noticed that the observation car bore the name Fort Resolution. That, of course, was the name of a noted post of the Hudson's Bay Co. on the famous Great Slave Lake, both of which were enveloped in romance in my public school geography days. At that time they could be reached only after weeks, perhaps ~~of~~ months, of arduous travel by land and water. Now (1950), by air one can leave a large centre of population on schedule and be there in a few hours! Our train left Winnipeg at 10.00 p.m. C.T.

#### Wide Wheat Fields: Buffal Park

Saturday, June 10. Melville, Sask., 7.42 a.m. C.T., 279 mi. from ~~W~~Winnipeg. We had passed out of Manitoba and 66 miles into the province of Saskatchewan. For the first 200 miles the route had been almost directly west; then we turned north-west. Melville seemed an important town in the midst of wide wheat fields, but I was surprised to see considerable grain standing in stock! Apparently the previous winter had set in early and it could not be harvested.

At Watrous (408 mi.) the time zone changed. We arrived at 11.55 C.T., and, after a stop of 10 minutes, left at 11.05 M.T. At 1.05 p.m. we reached Saskatoon (470 mi.), a thriving town, and at 3.20 we came to Biggar (534 mi.). Hour after hour we sped along the smooth and level road, often for many miles without a curve. There were numerous wild ducks and several hawks, while the little gophers were seen sitting upright, watching for their foes. The prairies were green and the sloughs were full of water. A vision of immensity, with promise of a good harvest! About two



miles west of Wainright (674 mi.), which was reached at 7.20 p.m., was the Buffalo Park, but we could not see any of it from the train. At the station was a fine stuffed specimen of a buffalo. The Canadian and United States governments are to be commended for their successful efforts to save the buffalo from extinction. Near Irma (691 mi.) I saw a derrick used by the Imperial Oil Co. in drilling for oil. We reached Edmonton (800 mi., alt. 2154 ft.) at 11.20 p.m. We were met at the station by Dr. T.H. Whitelaw (my old college mate 'Tom') and Mary and soon were at their home. To bed at 12.15 a.m.

#### Edmonton's Rapid Growth

This was my third visit to Edmonton in fifteen years, and the development of the city in that interval was notable. Its population had doubled and was now 60,000; and one could comfortably pass from one side of the river to the other without going down in a deep gully. But to me the change was specially significant in the erection of impressive provincial and municipal buildings, including schools, and supplying the fine structures for administration, instruction and research at the University of Alberta.

I might also remark that I was pleased to see that the main streets had not expanded further in width and that the house-numbers had not grown beyond eight digits in length.

Sunday morning was fine and warm --about 80° F. We went for a short ride and passed through the grounds of Government House. Here was a fine stone edifice set in a well-kept property. I was particularly pleased with the many kinds of shrubs which seemed to thrive in this latitude of 54° and altitude of 2185 feet.



In the afternoon we had another drive; there were so many new things to see. Also, Bessie the medical student and her uncle the M.O.H. visited the hospitals.

In the evening we attended the historic McDougall Methodist Church (McTavish the minister) and after the service some 25 persons gathered at Dr. Whitelaw's house — the telephone having informed them of our presence in town. Among them were John T. Ross, the deputy minister of education; W.F. Gillespie, M.B. '20, U. of T., and Mrs. Gillespie. I believe Dr. Gillespie came from near Cannington, Ont., and he wished me to take back greetings to our mutual friend A.T. DeLury.

Monday, June 12. First, I went with the M.O.H. to his office in the City Hall where he arranged for his duties for the day; and after that we all visited the Parliament Building which is on the high bank of the Saskatchewan River. Mr. Ross put us in the hands of Sergt. Major Turner, the sergeant-at-arms, who explained every part of the building to us.

The ladies then went to Mrs. Ross's for luncheon and Tom and I went to the Macdonald for the Canadian Club Luncheon at 12.30. There were between 75 and 100 there, an exceptional attendance. Mr. Ross was in the chair. I was on his right and Chief Justice Harvey, '86 U. of T., on his left. In addition there were Premier Greenfield, Atty.-Gen. Brownlee, Dr. R.B. Wells, '94 U. of T., Former Prov. Sec. J.L. Cote, Dr. T.H. Whitelaw, George Gowan, Prof. R.W. Boyle.

I spoke on "The Einstein Theory and the Australian Eclipse", and took up about 45 minutes. I had eager attention. After the



meeting my heart was warmed when about a dozen of my former students gathered round me, —including Sheppard, <sup>H</sup>Wicks, Bell (Med.), Hedley and many more. They had been attracted to the great west and were mostly high school teachers.

After this we picked up the ladies and then visited the University grounds. We met President H.M. Tory and inspected the imposing main building. Then in the Physics Laboratory Prof. Boyle showed us some experiments on supersonic waves upon which he had been making extensive researches. They were of the same nature as sound waves but had a frequency of about 150,000 and hence were far beyond the range of audibility. They were generated by a quartz plate made to vibrate by piezo-electric action, and were received by another quartz plate. These crystal plates are almost indispensable for regulating the frequency in radio.

When the National Research Laboratory was organized in Ottawa, Professor Boyle was chosen head of the Physics Division.

A very effective Medical Building had only recently been opened; we were conducted through it by Dean Rankin.

The day was passing quickly and there was still much to see before we should move on. So we had early tea and then went down to view a baseball game between Calgary and Edmonton. There was a big and noisy crowd. Lieut. Gov. Brett pitched the first ball and Mayor Duggan caught it-or tried to. The score was very close, 4 to 3 in favour of the home team.

#### My Old Country School Again

While I was at the ball game a message came to me from Walter McCallum. He was one of my older scholars when I was



teaching the country school at Maxwell, 1884-86. There was a large family and five of them passed through my hands. I rang him up and he said he would be at the station, that he wished to see me.

We left our house about 11<sup>15</sup> o'clock and on our arrival at the station he was waiting there. I knew that Walter had gone railroading as I had seen him acting as fireman on a freight train passing through my old home town, but that was many years ago. We had a very interesting talk. He had been in Alberta since 1906 and was now engineer on the passenger train running between Edmonton and Edison (130 mi.). He gave me news of the old home in Osprey township. His father had died two years before (i.e. in 1920) but his mother was still living. Albert, the oldest of the children, died ten years before. Nellie, with the black flashing eyes, whom at the age of five I had started in the First Primer, died in 1918 of the "flu". Annie and Maggie, two older girls were married and still living. Then he told me of some of the other children of the neighbourhood. Cyrus Field was a tailor in the village and had lost a son in the First War; his fair-haired sister Alice was dead and the whereabouts of his brother Fred, who was the best penman in the school, were not known. Of the two grandsons of the bluff old Yorkshire blacksmith at whose house I lived for a year and a half, Harry was M.B. U. of T., '15 and was practising in Maxwell, while Willie, the elder, was railroading. We filled up our minutes with most interesting conversation.



McCallum introduced me to W.A. Brown, the General Manager of this division, who told me that Premier E.C. Drury of Ontario and a party were on the train and going through to Vancouver.

### Jasper Park and the Rockies

The train (No. 3) came in from the east at 11.20 and left at 11.50. Our berths had been reserved some days before and were Sec. 3, Car 153; but the porter had given them to someone else, although the conductor had the record. He gave us Sec. 8. The car was named Yarmouth; the observation car, Fort Ellice, which place, I believe was in Manitoba on the Assiboine<sup>ni</sup> River near the Saskatchewan border.

We passed through Edson (930 mi. from Winnipeg) during the night. At Jasper Park (1036 mi.) the time zone changed from Mountain to Pacific, and a stop of half an hour allowed one to view the wonderful scenery and to take some photographs. Premier Drury, Hon. S.C. Biggs, '72 U. of T., and W. A. McLean, the deputy minister of highways, and members of their families were traveling in the Ontario Gov't car Temagami. I am sure everyone enjoyed the extraordinary trip through the mountains. We sat at the rear of the observation car nearly all day. McLean came through during the afternoon. His party was on the way to Victoria to attend a Good Roads Convention and they would begin their return<sup>to Toronto</sup> on Tuesday, June 13, via C.P.R.

From Jasper onwards for many miles the Canadian Northern track bed ran alongside the Grand Trunk Pacific line, and the rails had been removed from the former. I had seen where similar action had been taken in several places in Ontario. We are paying for such wasteful railroad building now.



At Red Pass Junction (1091 mi.) the line divides into two. The north branch runs northwest and then chiefly west. At first its course is along the upper Fraser to Prince George (209 mi) and latterly along the Skeena to Prince Rupert on the Pacific Ocean (677 mi. from Red Pass) This entire region is of a scenic nature.

The south branch, on which we travelled, leads to Vancouver. When about 10 miles on our way the train stopped for five minutes for us to view Mt. Robson, 12 miles away. The summit (12,972 ft., the highest in the Canadian Rockies) was somewhat obscured by clouds. After leaving the upper Fraser our course turned south and followed the North Thompson river to Kamloops (1308 mi.). A little farther on the Thompson unites with the main body of the Fraser and the great body of water sweeps forward and spreads out into the great ocean. A portion of this trip was made during the night, but throughout its entire length the Fraser is rapid and impetuous, and in many places is not navigable even by a canoe. In its southern portion it flows through majestic canyons, which, like those of the Thompson, have been the scene of many tragedies.

#### Vancouver, Marine Drive and Stanley Park

Wednesday, June 14. Vancouver, (1571 mi. from Winnipeg) was reached about 8.30 a.m. We expected to sail on the S.S. Makura on Saturday the 17th.

After securing hotel accommodation we went to the Canadian-Australasian Steamship office to inquire about the ocean passage of ourselves and the transportation of our baggage and freight to Australia. The manager was G.R.G. Bagnall. Now it turned out



that Mr. Bagnall came from Charlottetown, P.E.I., where he was a friend of Mr. & Mrs. Messervey, also of their friend Mrs. Craig who was in the shipping business in Auckland, N.Z. Further, Grace and Ethel Messervey (daughters) had, been students in astronomy at the U. of T.; still further, in the summer of 1920 my wife Jean and I had taken a trip to the Maritimes and had called at Charlottetown to see our friends. Not unnaturally we received devoted attention to all our wishes. But every little detail had been arranged with the greatest care. Indeed everyone since we had left home seemed interested in my expedition and anxious to be of assistance to us.

In the afternoon from 2 to 4 o'clock we greatly enjoyed the Marine Drive. There were many fine residences, and the profusion about them of rhododendrons, roses and other flowers rendered them very attractive. Soon after our return from the drive my experience as a country school teacher was again recalled to me. Five members of a much loved family at Maxwell were now living in Vancouver and the widowed mother (Mrs. Kerr) and daughter Amy, B.A. '04, U. of T., called to see us. It gave great pleasure to us all, and we had a happy dinner together that evening, with our reminiscences of 35 years before. We five closed the day with a drive in Stanley Park.

Next day we were going on to Victoria and on the following day were sailing from that port.

Victoria, the Butchart Gardens, the Observatory

Thursday June 15. At 10.30 a.m. we went on board the Princess Charlotte. The passage, 83 miles, was quiet and smooth. As we



approached Victoria the islands on the right and the Olympic mountains on the left presented very pleasing views. The flaming broom shrubbery was now out in full brilliance on the shore of Vancouver island.

We arrived at 3 o'clock and were met by Mr. and Mrs. Harper and R.K. Young, and we all made our way to the Harper home. We had a long talk about our expedition. I found that Dr. Young had planned many things and had constructed a mounting for the polariscope camera which we would carry with us as baggage.

John Blue of Edmonton, '06 U. of T., a classmate of W.E. Harper, who was attending the Good Roads Convention, came for supper, and in the eveing L.N. Richardson, '07 U. of T., D.A. Robinson and Elliott, of the Esquimalt Naval College, which had recently been closed, joined the party, with their ladies. It was a happy gathering.

At the request of the city editor of the Victoria Times, who had left Perth, Western Australia, 12 years earlier, I called, on Friday morning, at a studio to sit for my portrait; and then I walked down to the Empress Hotel. Here I found my friend Prof. A.T. Laing and his wife. Laing's subject at the S.P.S. was "Highways" and he was attending the Good Roads Convention. Through the Laing's I met many other guests at the hotel. I decided it was a very pleasant place to hold a convention.

The next important function was a R.A.S.C. Luncheon at Spencer's at 12.15. There were 35 present. After the meal I spoke on our eclipse expedition, somewhat as at Edmonton. I had a splendid hearing. Besides the professional astronomers, I met



Symons, Chadwick, Umbach and many others; also H.H. Smith '00, U. of T., originally from Scotland P.O., Ontario, whom I remembered well as a student in the Natural Science course. He was another university man attracted to the great west.

After the luncheon Mr. & Mrs. J.S. Plaskett drove my party about the city and the waterfront. It was very pleasant and the scenery was very fine. I remember the trees at Mr. Pendray's place cleverly trimmed to represent swans and other objects. After dropping Mrs. Plaskett at her home we then drove to the Butchart Gardens near Brentwood, about eight miles from the Observatory. Here was the acme of beautiful scenery. I never saw anything so tasteful and altogether lovely. Among the visitors at the time were Premier and Mrs. Drury and with the help of my friend Plaskett I got a pleasing film of them with myself in the group. Just a few words with the premier showed me that he was well informed in the elements of astronomy.

In the evening we had dinner at the Director's residence at the Observatory. Besides my family there were, of course, Mr. and Mrs. Plaskett and also son Harry who was developing into an accomplished astronomer, and in addition Judge and Mrs. McIntosh. It was a pleasing occasion. After dinner we inspected the Observatory, the existence of which, it could certainly be said, was due to the initiative and active efforts of J.S. Plaskett, who as its Director brought distinction to it throughout the world.

We had opportunity to observe the planets Jupiter and Saturn, using magnification 600x, and, as a contrast, a simple star of 6.2 magnitude, the limit of vision with the unaided eye. The



"seeing" was poor, but the observations were very interesting and satisfying.

This was the last item on our programme before we should leave by ship on the morrow. Judge McIntosh drove us to the hospitable home of Mr. and Mrs. Harper.



### 3. The Voyage on the Pacific

Saturday, June 17. We had secured accommodation on the Makura, a fine ship of 8000 tons. The name is a Maori word meaning 'sedge'. She was expected to leave Victoria at 11 a.m. but actually did not leave her dock until 3.30 p.m. She waited for the mail from Vancouver.

However we went on board in the morning, and on going to our staterooms we found a night-letter from daughter Etta, a "marconigram" from J. A. Pearce ( both from Toronto); roses for Bessie (name of sender not attached, probably my long-ago pupil, Amy Kerr in Vancouver); and a lovely basket of fruit, with the following letter:

Toronto June 5, 1922

Dear Mrs. Chant,

I have asked my brother in Vancouver to put on board the steamer a small basket of western fruit.

I hope you have a safe and pleasant trip to the antipodes and that the ocean may be reasonably "pacific".

Yours sincerely,

H. A. McTaggart.

McTaggart, M.&P. '07, was in charge of the x-ray services in the U. of T. General Hospital in the First World War. He returned to be a professor of Physics at the University; and died in 1941, aged 65.

During the morning we had a pleasant drive with Mr. Symonds, a local amateur astronomer, and after it had lunch on the ship.



The Harpers came down to the dock to say au revoir, and indeed everybody was extremely kind. We fell among friends!

As the ship got on its course the mountains in the state of Washington presented a fine show. First, the Olympic Range, with Mt. Olympus (7915 ft.) as centrepiece, appeared directly across the strait of Juan de Fuca. Then, in the Cascade Range, Mt. Baker (10,750 ft.) was seen farther east, and later in the south-east was Mt. Rainier (14,408 ft.), the finest of them all. On each of the latter two the snow on its summit and its ribs was very prominent.

In the passenger list of the ship there were 86 in the first cabin and 57 in the second. After dinner in the evening Young and I talked eclipse; and as we sat in the music room a group of young people sang songs from the University of Toronto Song Book. This was very interesting to me and brought back old memories. That book was published when I was a student at the University and I bought one of the first copies from the press. I was well acquainted with the editor, J. Edmund Jones, '88 U. of T., and other members of the committee which prepared it, and a considerable number of the pieces in it were composed by persons well known to me.

Among these was one entitled "Honour Old Varsity" (p.89) to the tune of the Norwegian National Anthem. The author, or adapter, of the words was E.C. Acheson '89, the father of the famous Secretary of State fifty years later. I give the first of the three verses:



Minstrel awaken the harp from its slumbers,  
 Joyfully strike for the old Varsity!  
 High and heroic in soul-stirring numbers,  
 Dear Alma Mater, we strike it for thee.  
 Old recollections wake our affections,  
 Each time we speak of the days that are past;  
 Hearts beating loudly and cheeks glowing proudly  
 Honour old Varsity and will to the last.

Before going to bed, following instructions on the bulletin board, I turned my watch back 36 minutes.

In the morning the steward brought a supply of hot water; also a cup of tea, 2 biscuits and fruit.

#### Some of our Passengers

My room-mate I found to be C.W. Aulsebrook, of Brisbane, Queensland. He was born in Philadelphia but had been in Australia for 30 years.

Also on board was Sir W. Beach Thomas, a London journalist, on a round-the-world-on-British-territory trip. He was an Oxford <sup>man</sup> astronomer. He also knew James Mavor, Dr. I.H. Cameron and J.B. Bickersteth, Warden of Hart House, all of Toronto. In 1902 he had visited Goldwin Smith (1823-1910), whose residence was The Grange which, after the death of himself and his wife, became the property of the city of Toronto and which is now its Art Gallery and the seat of the Ontario College of Art.

In the year 1925 Beach Thomas published "A Traveller in News", chapter 12 of which gives some account of this crossing of the Pacific. He has continued to write books, dealing chiefly with country life. In 1850 he published a highly praised book on "Hertfordshire".

Another round-the-world traveller was Miss Ranolina Stewart of Edinburgh, who had just come from visiting friends in Guelph,



Ont. Some person had left her some money, with the request that she would take this trip. She was not youthful in years but actively participated in the sports; also, she had a good voice and sang in the Passenger's Concert. My family sent her Christmas greetings for many years.

I was pleased to meet Sir Henry Barwell, the premier of the state of South Australia. He had been in London and was returning home. In England he had inaugurated an assisted immigration project aimed at securing a large number of desirable young men. It offered £12 out of a £38 passage out and many special advantages. Addressing a Rotary Club in Vancouver, he openly favoured the admission of other than white people to the sub-tropical parts of Australia. Also, he opposed too much government control of business.

On Sunday morning, as there was no clergyman available, the regular service was held in the dining room and was conducted by the captain, R. Crawford, a Scottish-born New Zealander.

The ship's run for the first day to noon Sunday was 311 sea-miles; and on Sunday night the clock was retarded 26 minutes. At noon on Monday the ship was in lat.  $41^{\circ} 42'$  and her run was 358 sea-miles.

Tuesday, June 20. This was our 28th wedding anniversary. A fine day, distinctly warmer. At noon we were in lat.  $37^{\circ} 45'$  and the ship's run was 353 miles. At the end I shall give our complete record to Auckland.

At 10 a.m. there was a meeting to choose a committee on sports. In this our captain took great interest and he also took



an active part in the deck games. In all my travels I never saw sports tournaments, concerts, lectures, dances and parties so well organized as under Captain Crawford. He aimed to have everyone busy and happy.

#### Bursting of a Steam Pipe

At 5.45 p.m. on Thursday, June 22, the entire deck was filled with persons contending in the sports tournament, Capt. Crawford playing quarts. When there was a big noise and I saw escaping steam. The Captain did not leave off at once, but continued as though nothing had happened. However, he did not delay very long but went below to see what was wrong. We who were up on deck saw that the ship was travelling about in circles, as though only one of the twin screws was operating; and then the engines stopped altogether. The sea was calm and the ship was perfectly still. With the shutting-off of the the power the electric service failed. We remained at rest in the middle of the ocean in the growing darkness for three hours. Occasionally the lights would come on and then fade away, but at about 9 o'clock we got going again. I asked what had happened and was told that an auxiliary pipe leading from the main steam pipe had burst. To prepare for such an emergency, I was informed that alternate paths for the steam are provided, so that if one path fails it can be cut out and the steam directed through the other.

Later in the evening there was a concert in the music room. Mr. Lindo and Mr. Vincent, two accomplished performers played on the piano. The former was going from London to Sydney to



to conduct the examinations at a conservatory of music. Also three ladies sang and there were several choruses, for which W.G. Kither, a first cabin passenger and a musical genius, played the accompaniments on the piano. If an accompaniment was wanted Kither was always on hand to render that service.

Next day just after lunch Bessie espied a sail on our starboard. It was a 4-master schooner sailing parallel to our course but in the opposite direction. With our binoculars we could pick it up easily, but the hull was hidden by the rotundity of the earth.

The tournament closed on this afternoon; there was a dance in the evening on Deck A, when the prizes were presented; and the officers were all dressed in white.

Next day, Saturday, June 24, was a fine bright day. At about 5 a.m. I heard someone on the upper deck call out, "Land ahoy!" A little before 6 I got up and, sure enough, there was the Island of Oahu on the starboard, quite close. It looked rugged, although in the field-glasses one could see cultivated fields. We watched it as the ship steamed on and circled about Diamond Head. Then, at 6.30 we came to a stop while the Quarantine, Customs and Immigration officers came on board. We were lined up on the deck, noses were counted and all were soon passed.

Then the ship moved on to the dock, and at 9 o'clock we were ashore.

### The Day in Honolulu

The four members of my party together with Beach Thomas and our Edinburgh lady hired a Packard car and drove to <sup>the</sup> Pali. <sup>(the Pacific)</sup> The view



was charming. Down 4400 feet in a direct drop below our level was a plain of red earth with green trees and fields picturesquely cut out of it. There were hundreds of acres of pine-apples. In the distance was the delicate green, blue and blue-indigo water, while to the left was a sharp peak which towered upward, I judged, 3000 feet.

I took several photographs and then we drove back to the Aquarium, and here the show of odd-shaped and beautifully coloured fish was remarkable. Such brilliant things seem characteristic of the tropics. Also we saw some octopuses or squids, most extraordinary and repulsive objects. Beach Thomas told of a person who when brought into the presence of a collection of such things as we were looking at would only say, "I don't believe it." We heard also of an old lady who, when she saw a hippopotamus open its mouth, declared that it was so remarkable that it could scarcely be human!

Next, by street car we went to see the Mauna Loa Hotel, an immense summering place, just then filled with Shriners who had come a few days before in two ships. The surf-riding and swimming on the beach made good sport. At lunch that day Bessie and I ventured on mango pie a la mode and found it delicious.

At last, however, the steamer blew three long blasts to call the passengers to the dock. There were many natives about the place and some of them climbed to the top deck and dived off the life-boats-a <sup>height</sup> distance of about forty feet. In addition there were about 20 natives swimming about the ship and diving for coins tossed overboard.



The city was pretty American, but the profusion of banyan, mango, poinciana and other strange trees, many covered with brilliant flowers, as well as the bananas, palms, bamboos and the brightly-coloured hedges made a striking picture.

The ship started from her moorings so gently that one was almost deceived as to which was moving, the shed on the dock or the ship.

### Men may come and men may go

I found that some twenty of our passengers had left the ship--indeed it seemed that the most observed 'birds of paradise' had gone from our company--and in their place about an equal number of new passengers had joined us. At dinner two new girls were given places at our table. The one next to me, Miss Gladys Wilson, who wore heavy-rimmed spectacles, had, I found, formerly lived at Carleton Place, Ont., and for five years was a high school pupil of a friend of mine, W.E. Rand, M. & P. '91, when he was principal. Her brother was a big contractor in Honolulu and had invited her out eight years before this, after her father's death. She found the weather rather "trying" on account of the humidity and was going to Sydney for some months of the winter. The earth seemed small!

This morning I saw a flock of flying fish as well as several single ones. Also there was a school of porpoises near Honolulu. In the evening the air was exceptionally clear and there was a great display in the sky. In the south, as plain as could be, was the Southern Cross, with the bright stars Alpha and Beta of the Cent<sup>a</sup>our pointing directly to it. The planets



also were wonderful: Venus, Mars, Jupiter and Saturn were all prominent objects. The reflection of Venus on the calm water was very marked, almost like the moon. Many on the ship could hardly believe it was a planet, but thought it a light-house at a distance.

Sunday, June 25. A bright day, in midsummer, in the middle of the Great Ocean. At noon our position was lat.  $16^{\circ} 20' N.$ , long.  $160^{\circ} 41' W.$  The Captain read the service at 10.45 a.m. in the dining room and there was a good attendance.

#### Some of Captain Crawford's Experiences

In the evening Capt. Crawford told Young and me some of his experiences in this ship in the First World War and we discussed wireless, south sea islands and other matters. On the way in to Victoria, B.C., when the sky was thick, he said he sometimes checked his distance from the shore by the reflection of sound. He would give a sharp "toot" with the whistle and then count the number of seconds until he heard the echo. The distance would be one cable (600 ft.) for each second. I suppose radar is the ordinary method now (1951).

After leaving the captain, Young and I studied the stars for some time. The Southern Cross was just setting in the south-west and  $\alpha$  and  $\beta$  Centauri were prominent. The Scorpion, which I never could see well at home, was high in the sky, and its whole length, down to the two stars in its tail, could be seen. But I had difficulty in recognizing the "Milk Dipper" in Sagittarius: it was far to the east and was not inverted as we see it in the north. Mars, Venus and Jupiter were very bright.



The captain asked about Todd's proposal to use a South American mine shaft to photograph Mars.

When Captain Crawford was loaning me some copies of the National Geographic Magazine I glanced over his library and among his volumes I noticed Shakespeare, Tennyson, Kipling and Agnes M. Clerke's System of the Stars.

#### Psychic Power and Hieratic Writing.

Captain Crawford told me a remarkable story of psychic writing. Mr. Sam Baldwin was a large rancher on Maui I., T.H. He and his wife were both children of missionaries, and he was a brother of the Representative from T.H. to the U.S. Congress. Mrs. Baldwin was a small, active, motherly woman and was reputed to have psychic powers.

On a recent trip southward the captain asked Mr. and Mrs. Baldwin up to his room. He and Mr. Baldwin occupied the couch while Mrs. Baldwin sat at his table, with a sheet of paper before her and a pencil in her hand. At first she wrote, in an almost natural hand, a statement that she felt somewhat unresponsive; and then she began to make some extraordinary 'hieroglyphic' marks and covered several sheets of paper with them. She did not know the significance of this writing and it was done in about 20 minutes.

Upon arriving at Fiji Capt. Crawford showed the writing to three Hindoos there, but they could not read it. Some three months later Professor Goddard, whose home was in Brisbane, was on board on a northbound trip. He had made some archaeological discoveries in Mesopotamia and had read various



inscriptions written <sup>in</sup> hieratic characters — including some fairy stories and a statement made by a commercial traveller that he had gone up to another part of the country and was overtaken by bitter weather and wished for warmer clothes. Crawford showed the writing to Goddard who said it was in hieratic characters, similar to those used 5000 or 6000 years ago! He read portions of it, in which it was mentioned where Crawford and Baldwin sat in the room. Some of it Goddard could not decipher but he declared it was genuine hieratic writing. Captain Crawford showed me some more writing which she gave him on a later voyage. \*

The captain asked me if I would give a lecture to the passengers on our expedition. He said T.A. Jaggar, W.M. Davis and some others had addressed his travellers. I said I was "at his service."

It was very interesting to see Polaris so low down in the sky — about  $8^{\circ}$  this evening (June 25) — and to think of the celestial equator being almost in the vertical.

The new tournament began Monday, June 26, and everybody was engaged in the sports.

During these days within the tropics the sun beat down upon us, but the trade winds blowing from the east at 2 or 3 miles an hour made the weather pleasantly cool.

#### Two Concerts, Calcutta Sweepstakes, Fancy Dress Ball

On the evening of June 27 there was a concert given by the passengers. Beach Thomas was in the chair. The first piece was a "symphonic poem" given with great vim by musician Vincent at the piano and many others with all sorts of instruments. This

\* Prof. T. J. Meek of U. of T. informs me he has not heard of an archaeologist named Goddard (June 25, 1951)



was followed by songs by several ladies, and then the chairman gave a 7½ minute address on some comic experiences in Ireland. He said that a speech should be like a lady's dress — short enough to be interesting but covering the subject decently.

Next evening was the Steward's Concert — a burlesque affair. The chief steward, with his big crooked walking-stick, personated Harry Lauder and was very good; and a 'siler', who was employed in the baggage room, sang some comic songs in a masterly way. He had a high tenor voice which he could manage extremely cleverly. I was told that he was a professional entertainer. Some of his songs needed pruning. In the orchestra were about 15 violins, mandolins, ukeleles and banjos. There was no lack of musical talent.

There was considerable gambling on the ship. The betting on the ship's run was purely a gambling matter and there was plain gambling in many ways. One of the Australian passengers told me that gambling was very prevalent in the Commonwealth, and that Tasmania had "raised" itself from insolvency by its lotteries.

At noon on June 28 we were in lat. 0° 41' N., and as we steamed at 15 knots we crossed the equator at about 2.45 p.m. Nothing happened!

Next day after dinner was the auctioning of tickets for the Calcutta Sweepstakes. By an elaborate scheme, nominally based on the ship's run, the "pot" was raised to about £75. It was not an edifying sight and my party did not take a hand in the performance.



Friday, June 30. In the morning the games of the second tournament were busily played. At noon there was a fierce squally rain which lasted for an hour or longer, and it was followed by a stiff breeze which made the ship roll and pitch. Then at 3.30 p.m. there was a boat drill in which we all joined.

In the evening was the Fancy Dress Ball. Bessie went as a Japanese lady, the costume being supplied chiefly by Miss Wilson. There were many good costumes, cleverly built up from all sorts of materials.

A look at the sky this night revealed Mars almost at the zenith, Scorpio strung along east to west overhead and Cygnus standing almost on its head:

#### No Saturday and no Dominion Day

The next day was Sunday, July 2. There was no Saturday and no Dominion Day 1922 for us! As a matter of fact, at noon this day the ship was in long.  $177^{\circ} 57'$  W. and the omitting of the day is supposed to be at long.  $180^{\circ}$ . However, if we had waited until then the day omitted would have been Sunday, the day of rest, and the Sailor's Union would not agree to that. At about 10.30 a.m. we met the fine big sister ship Niagara about 7 miles on our starboard. We met her just as we were passing Horne I., which is under French control. It was Sunday with us, but on the Niagara it was Saturday repeated.

#### Fiji Islands

On Monday morning about 7 o'clock the steward said we were passing Leviku, the second largest business centre in Fiji. We went steadily onwards and the islands on our starboard



became nearer and clearer. There was a distinct line separating the deep sea water without and the shallow water within the coral barrier reef. At one place was the stern of a ship which had been wrecked and near it was a lighthouse. Then we saw a town in the distance-Suva. The ship slowly turned through an opening in the reef and was warped up to the dock. Lat.  $18^{\circ}$  S., Long.  $178^{\circ} 30'$  W.

This was at 11 o'clock, and at 11.30 we were allowed ashore. The dock was nearly covered with bare-footed, woolly-headed Fijians, who did the work of unloading and loading. Some were rather fine specimens, mostly clean and good-natured in appearance and wearing 'knickers' or very short 'skirts'.

My party of four, along with Miss Stewart and Mrs. Wiltshire (of Sydney) engaged a Hup motor to drive us about the island, and I got a number of pictures of the natives and of the palm trees. Then we had lunch at the Grand Pacific Hotel. Here we had some native dishes--yam, breadfruit, mummy-apple, and other things, most of which we did not greatly relish. It was said that a wireless message had been sent to the manager of the hotel to have for lunch as many native fishes as possible, but the message was received as native dishes, in the Morse code f and d being very similar. There was a big crowd and the service very slow.

I took a photograph of the cement pier behind the Cable Station which Dr. Otto Klotz used when measuring trans-pacific longitudes in 1902-03.



I was surprised to see so many Indians (Hindoos) living on this principal island, Viti Levu (Great Fiji), but on consulting the records I found that in 1921 there were, in all the islands of the group, 84,475 Fijians, 60,634 Indians and 12,156 of other sorts. The Indians have been there for many years.

It was a most interesting and picturesque day. The natives sang on the wharf and all cheered as we set sail at 6.15 p.m. Tuesday, July 4. By 8.30 p.m. the tables in the dining room had been cleared and a large number had gathered to hear me speak on "The Einstein Theory and the Australian Eclipse". Sir Henry Barwell was in the chair and graciously introduced me. In my address I followed the same line of thought as at Edmonton but dwelt more on Australian details. I certainly had good attention and after the lecture many expressed their appreciation of my address. The ship's Doctor wished me to meet W.F. Gale, a well-known amateur astronomer (and banker) of Sydney. I had the pleasure of doing so a few weeks later.

This being Independence Day, at the end of the dinner the orchestra played The Star Spangled Banner and God Save the King.

#### Rough Weather

Suva is  $1\frac{1}{2}^{\circ}$  beyond the date line (sailing from America) and our ship's course from it to New Zealand was directly south. It was mid-winter in the southern hemisphere, the days were getting shorter and the air was considerably cooler. The wind in the N.E. made the ship roll more than on any previous



day. But the weather did not bother us. At the Captain's invitation, Jean, Bessie and I went up on the bridge and he showed us all over the upper portion of the ship. He was born in Scotland but went to New Zealand when very young and six brothers were born there. One was killed in the First War. In 1897 he sailed on a schooner to Victoria, B.C., for lumber.

Next day the wind was stronger. In the morning I felt quite normal and proceeded by the long passageway to the breakfast room-but did not go in. I thought I was fully acclimatized, but such was not the case. *I retreated to my stateroom and lay on the bed all day.* No breakfast or lunch, but some dinner brought to me in the evening. Bessie was in the dining room for the three meals.

The ship pitched and rolled furiously and some of the people could not stay in the upper berths. One woman (Mrs. Burgess) was rolled out, and at night Barwell put his mattress on the floor. The waves broke a window in the upper lounge and also did other damage. In the evening at dinner a great wave struck the port side of the ship and water-bottles, salt-cellars and other things shot across the tables and some of them went on the floor. One of the girls (Lenore Mason) sitting at the meal grasped out quickly to save a carafe but slid right under the table!

#### In New Zealand: Among Friends

Friday, July 7. One month since we left home. The sea was quieter to-day. From early morning we were in sight of land-the northern half of the North Island-and as the day



wore on our route became more sheltered. At last we stopped in the splendid harbour of Auckland. After examination by the Immigration and the Health Authorities we moved on to the commodious dock. The distance from Suva to Auckland was 1140 ~~sea~~ miles.

As we intended to remain in New Zealand until July 20, we were somewhat deliberately gathering up all our luggage, when one of the stewards told me that a lady was waiting on the dock to speak to me. We hastened down the gangplank and were met by Mrs. Craig, the friend of our friends in P.E.I., who had informed her that we would be on this ship. She had brought <sup>in</sup> bouquets of violets for Jean and Bessie and an invitation to her home for afternoon tea. J.J. Craig was the head of a large shipping firm. He died in 1916, during the First War, and Mrs. Craig took his place in the business while a son, James C., became managing director. A younger son, while on active service, lost his life by accident in Scotland during the First War. A man from the firm helped us through with our luggage and took it up to the Central Hotel, while Mrs. Craig's car took my party there.

Mr. J.C. Craig came a little later and drove us up to his mother's home at 67 Mountain Road, Epsom. It was a beautiful place with a wonderful outlook. The garden was filled with tree-ferns, camellias and other shrubs strange to us. Here also were bitter oranges and lemons, ripe on the trees.

Our ship Makura was to sail the following afternoon to complete her trip across the Pacific to Sydney, N.S.W., and Mrs. Craig and two daughters were going to that city for a visit of some weeks.



To wish a safe voyage to them and to our fellow-travellers on what was a notable passage to us, my party went to the dock. It was a privilege to travel in such a company.

We were to be in New Zealand for thirteen days and there were many things to see. During that time our indebtedness to the Craig family was further increased. On Sunday (July 9) Dr. Alexander Kinder, who held the degrees B. Ch<sup>l</sup>, M.B., B.Sc., F.R.C.S., and whose wife was Mrs. Craig's daughter, called for us at 10 o'clock and took us for a fine drive, first up to Mount Eden where he pointed out the old crater of the volcano and the trenches by which the Maories effectively carried on their wars 1861 to 1871.

The city (pop. then 100,000) is surrounded by hills of volcanic origin. Besides Mt. Eden there are One Tree Mountain, Mount St. John and others, and it is very picturesque and beautiful. The streets are often steeply inclined and automobiles of that era had to take them "on low." The entire face of the country had a certain wildness as well as scenic beauty, quite different to our mild, familiar scenes in Ontario. Everything delighted us, including the midwinter weather in lat. 37°.

Continuing the story-almost a fairy story-Mr. James Craig took us to his new home on Mount Eden for dinner. The house was finished in Queensland maple which I thought beautiful. After dinner we went for another drive and in the course of it called on the two Mrs. Laurie (Mrs. Craig's sisters), and Mr. Phillips who married her daughter and who had lived in Vancouver for eight years. He was in the J.J. Craig firm. All this kind attention



arose through my happy acquaintance with two University students in Astronomy from P.E.I.

*P.W. Burbidge*

On Monday, July 10 Prof. P.W. Burbidge took us to the University of Auckland. It was not a very big institution and many of the classes were held in the evening. But I thought the instructors were real scholars and the teaching was of a high quality. The institution was organized to serve the community, with branches in different cities.

Then we went to the Museum in Princes Street which was open free to the public. The collection was chiefly remarkable for its Maori carvings, weapons and implements, its south-sea island curios and in particular a huge Maori war canoe.

At 12.30 by courtesy of Mr. Craig, Young and I attended the Rotary Club. The president was Mr. Rhodes; secretary, Mr. Hutchison; and the speaker for the day was Mr. Bidwell, who had travelled widely in Russia. He described some experiences and gave his opinions of the Bolsheviks.

### Hot Springs District

We agreed that New Zealand was full of natural wonders, and we understood that the Hot Springs District was celebrated for its unique scenery and for its novel opportunities for observing the life and customs of the Maori people. I remembered also the volcanic eruption of 1886 when Mount Tarawera "blew up" and did enormous damage, many of the results, at this time still to be seen.

So I purchased four single first-class tickets for Rotorua at £1 6s 4d. each with 9d. each for reserved seats, and telegraphed ahead to the Waiwera House for rooms.



The train left at 9.05 a.m. The railway was narrow-gauge and the train much like one we had travelled on in P.E.I. It had many cars and two engines to pull them. The seats were chairs, two on one side of the aisle, one on the other. The distance from Auckland to Rotorua was 171 miles, mostly southward into the middle of the North Island.

At first the country was rolling, but before we reached our destination it was rugged and mountainous. It was interesting to see the small 4-wheeled freight-cars (trucks) with a capacity of 8 tons of distributed load, but some trucks were larger with 8 wheels. The train would stop at the station and when the business was done the station-master would ring a bell, the guard would blow his whistle, the locomotive would give a single toot and off we would start.

Near Auckland the land was rocky with little upon it, but soon the soil improved and the farms looked quite prosperous.

The names were nearly all native Maori—Otahuhu, Manurewa, Papakura, Putaruru,— but at about 10.07 we passed a station called Drury and at 1 p.m., Hamilton—a fine growing town. One of the most pleasing names was borne by a station about ten miles before the end of the line. It was Ngo-ngo-taha (pron. no-no-ta-ha). The part ngongo is a pool of water in the hollow of a rock or a log where birds drink, and taha is side or margin. As we went along we saw groves of eucalyptus and later many kauri trees.

At 12.40 p.m. we reached Frankton Jet. and stopped for lunch—2/6, very good. Near Hamilton we crossed the Waikato River, a lively stream in a gorge. At Ruakura was an experimental farm, a portion of



which was devoted to the returned soldiers.

At 5.18 we reached Roturua, the end of the line. We were met by the Porter of the Waiwera Hotel and driven to it. It contained 60 rooms but had few guests. I observed that the "parlor" was heated by an open grate and it was quite comfortable although it was midwinter in lat.  $37^{\circ}$  S.

Next morning on looking out of the bedroom window I saw, perhaps a half-mile away, what looked like steam escaping intermittently from the earth. Living at the hotel was an elderly gentleman, Mr. Thomas Hallett, with his younger wife. The latter took us for a walk to nearby Ohinemutu where were numerous hot springs bubbling out of the ground. It was a wonderful sight and made one think that fire was not far below. In some places cooking -- such as boiling or steaming vegetables -- was going on under a blanket or a piece of burlap in a box without top or bottom placed over a hot spot.

We looked into an Anglican church, decorated in Maori fashion, where I believe the minister spoke mostly in the Maori language. There were certain notices in Maori, one of them being tapu = taboo, forbidden.

In many places on our walk were water-holes in which steam bubbled up and in other cases it came up through a mud-puddle. But throughout a considerable area there were clouds of steam rising from the ground.

In the afternoon we took a Ford bus to Whaka-rewa-rewa, about 2 miles south. The name means "a war dance to make a show of force before attacking". A government guide "Edie" (Mrs. Warbrick) showed



us about. At innumerable places hot gas or steam came from holes in the earth, and in other places there was vigorous boiling of water. Indeed boiling springs sometimes burst up on the shore of a cold pool or up through its chilly water. A bather could lie floating with his feet in hot water and his head in cold water. W.P. Reeves, who wrote the book "New Zealand" with all the beautiful pictures in it (Black, 1908), says he has actually done that very thing.

There were geysers, but not nearly so active as in past years, and we saw only two smaller ones. Of them, Papakura (an insect) was very lively. Great quantities of water were boiling violently and some was running over, so that water had to come in from some place.

Over many acres these hot springs are found. The whole area is a government reservation with each caretaker in his typical 'whare' (hut) and there are a number of appointed women guides. Some of them were handsome persons with flowing hair, but their chins were tattooed which destroyed their beauty for us.

#### Trip to Tarawera

Among so many exudations, hot and cold, from the ground, some of them, as might be expected, have become famous for their curative powers. Extensive baths have been provided and are under government control, and many visitors and patients come to them. At the time we were in New Zealand it was said that the architectural design and the completeness of equipment of the baths at Rotarua rivalled the most famous ones of the old world; while the variety and potency of the mineral waters eclipsed any other baths in existence.

However my party were all in good health and not specially



interested in the bathing facilities. Rather we were desirous of seeing the natural features of the neighbourhood. One of these was the effect of the great volcanic eruption of June 10, 1886. I remembered when it occurred and I read accurate accounts of what happened, made by intelligent persons who were in the midst of the cataclysm or were on the ground soon after. Indeed I could recall the greater catastrophe of the island of Krakatoa in the strait of Sunda between Java and Sumatra on August 27, 1883.

There were many trips one could take by motor car, motor boat or other means and some ill-feeling was exhibited by the persons who were providing these trips, and so we decided to engage a car and driver for ourselves. He was the owner of an open, 'brass-bound', Model T. Ford car of the period.

We went along the foot of the steep mountains past a great rent made in the earth in 1886. This was 3 miles long, 40 feet wide and 40 feet deep. It showed clearly in a photograph taken 36 years later. Then we went past the beautiful Blue Lake and Green Lake which were radically "made over" in the eruption; and came to Wairoa where was a village which took care of the many tourists who came to see the noted scenery. This place was completely wiped out. We looked with awe upon Tarawera Lake and Tarawera Mountain, a large part of which was blown off and fell on the neighbouring country as dust and stones and mud. Yet at Rotorua and Whaka-rewa-rewa the people walked about the hot springs without a thought of danger. Some of the magnificent old trees and other vegetation had been destroyed in 1886, but many more years would be required for Nature to remove the scars.



While on our excursion to Tarawera we saw large areas filled with eucalyptus, American larch, pinus insignis and other trees which had been planted, chiefly by prison labour, 12 to 15 years earlier. Some were 40<sup>feet</sup> high. It was the finest piece of afforestation I had seen and I was interested to learn that it was in charge of MacIntosh Ellis, B. Sc.F. '11, U. of T. The Faculty of Forestry was established in 1907, <sup>and Ellis was one of the first graduates.</sup> ~~Ellis~~ died in 1941.

We fully realized that there was still much to be seen in the country round Rotorua; also, we should have enjoyed a visit to the Lake Taupo district, 50 miles farther south, as we believed this the most active volcanic region in the islands; further, we were well aware that the scenery of the South Island, though of a somewhat different type, was quite as beautiful as that of the North; but we could not prolong our visit, and we prepared to return to Auckland on the following day (Sat. July 15).

This time I bought second class tickets for my party, costing in all, £3 4s. 8d., the saving being £2 0s. 8d. —worth while. We had reserved seats, but there was ample room, and we were just as comfortable. We reached Auckland at 4.58 p.m.

After dinner Bessie and I had a pleasing experience. We went to the Town Hall to an organ recital by Maughan Barnett, City Organist, Adm. 6d. It was in the big hall, capable of seating, I judge, 2200 persons. He was assisted by a Miss Nezdán who gave two pieces ( with encores ). All very good. A Russian pianist named Spavorsky gave a concert in the smaller hall in the same building. All the 3-shilling tickets had been sold or we should probably have gone to hear him.



### Last Days in New Zealand

On Sunday morning Jean and I set out for a Methodist Church said to be in our part of the city but we did not find it and instead went to St. Matthew's Anglican. The building was quite imposing but the sermon rather poor.

In the evening we heard an Anglican Missioner, Rev. Jasper Calder, in the Princess Theatre. There was a large audience and a good service. It would seem that Calder found himself hampered in his own church and started meetings in the theatre. His bishop was displeased but had become quite friendly again. For half an hour before the service an orchestra played. The preacher's subject was, "What is a gentleman?" and his text was Ps.<sup>Lxxv</sup>~~xv~~, last verse.

The Rotary Club Luncheon was held as usual on Monday at 12.30 in the Town Hall and I had been asked to address the members. About 80 were present. Rotarian Welsh of Philadelphia was at the head table. I was allowed only 20 minutes and I fear I exceeded it, but I had close attention and found it hard to break off.

After the luncheon Mr. George H. Wilson spoke to me. He said he lived in Toronto for 30 years and came to Auckland 12 years ago. His firm was Wilson and Canham (hides and wool merchants) and the business was carried on in Toronto still. He asked our party to come to his house on Tuesday evening. Later in the afternoon he called me up and said he would send a car to give us an 'outing' at 2 p.m. on Tuesday. A Dr. McKenzie also spoke to me and said he would like us to come to his house. I said we should be delighted to do so.



At 2 p.m. Mr. Wilson's Sunbeam car, with his chauffeur, came to the hotel, and we bundled into it. For three hours we drove about Auckland and then we made a complete circuit of the city. The country is very picturesque and close in to the city the soil is good and is cultivated by market gardeners. Actually three crops can be grown in a year. This was one of the finest drives we ever had.

The roomy Sunbeam car was at the hotel again at 7 p.m. and we were taken to Mr. Wilson's residence at 3 Uplands Rd., Remuera, a suburb, and there we were received very cordially by Mr. & Mrs. Wilson. Mr. Wilson came from England to Toronto when a young man. They lived on Brunswick Ave., above College St. Apparently his business was flourishing. His fine house had been built three years and it was full of good pictures and other art treasures. He had a fondness for Birkett Foster's pictures but he had other high-class paintings and beautiful vases. For one big vase I learned he gave £ 100, and for one of Foster's little water-colours, £375. He had many charming objects. After refreshments, served around the fireplace in the billiard room, we were brought home again. This was one of the most hospitable and most pleasant acts we ever experienced.

We had one more day to spend in Auckland. I had some letters to write and some business connected with our expedition which consumed all morning. Bessie visited the Hospital where she was received cordially, and, after being shown about the institution, was taken for morning tea (11 o'clock) at the home of Dr. Mc Guire, the superintendent. Young went up to Dr. Kinder's in the morning to play chess



with Maurice, an 8-year old invalid child, and Jean and Bessie went in the afternoon.

I was greatly pleased with the community singing from 12.30 to 1.30 for which both the great hall and the concert hall were filled. It was a grand sing-song of popular pieces.

In the evening we all went to Dr. McKenzie's home, 27 Princess St., accepting his kind invitation after the Rotary Club. He and Mrs. McKenzie welcomed us to their fine house. On the way there I noticed Calla lilies growing in a ditch. Present also was Prof. Johnston (in Biology), who had been in Toronto and had friendly relations with the U. of T.; also a Mr. Downie and a lady whose name I do not recall. All declared it a very pleasant evening.

We had greatly enjoyed our visit to New Zealand. I thought its people, with their somewhat Cockney language and the use of Sterling currency, bore a greater resemblance to the English or perhaps rather to the Scottish, than we Canadians did; but we saw enough independence in social and political matters and originality in adapting <sup>what might happen</sup> occurrences to their own conditions that assured us that the citizens of these islands were able to carry out their own destiny.

#### From Auckland to Sydney

Next morning ( July 20) we got ourselves and our luggage aboard the Manuka (4500 tons) and our staterooms were on the port side which, I understood, was the preferable one since our course would be almost directly west. Manuka in Maori is 'tea <sup>t</sup>Tree'; Makura is 'sedge'.

The day was unpleasant-cool, windy and showery. We left



Auckland at 1.20 and it was almost dark before we got out of sight of the land. Among the hundred passengers were Mr. and Mrs. Mason and Lenore, who had been with us from Vancouver and whose home was in Lismore, N.S.W., near the boundary of Queensland. The Masons and ourselves had seats at Chief Engineer McArthur's table.

On the following day the wind was from the S.E. and the weather was cold and showery. The ship pitched and rolled badly and many of the passengers were "not just right." I read quite a slice of "We of the Never Never," a copy of which I had been able to find at Brough's second-hand book-store in Auckland. The scene of the book is in the Northern Territory about 300 miles south of Darwin and <sup>five</sup> 5 miles from the overland telegraph line. The author, Mrs. Aeneas Gunn, came from the south as the bride of the new 'boss' of the Elsey Cattle Station. In a year he was dead! As our destination was far north in West <sup>arm</sup> Australia the narrative was of special interest to us. I knew of the book before we left home.

One of the passengers, Mr. Hardy, said that the trip was such a deadly one that he had brought an old Edison phonograph with a big valise full of "amberola" cylinder records. They enlivened the smoking room.

On the third day (Saturday) about half of the passengers were <sup>back</sup> in their places. At 10.30 p.m. we crossed the Makura, on her return trip from Sydney to Auckland and thence on to Vancouver. Mr. Mason sent a message to the Captain, as follows:



[ Kindest thoughts to Captain, Ship and Crew  
From Chants and Masons and Girlies too. ]

He did not sign it and the reply came addressed to me:

[ Thanks for wireless message; success to expedition.  
(Sig.) Crawford ]

Kind and thoughtful of Mr. Mason and the Captain.

Sunday, July 23. A beautiful balmy day --in the forenoon. The phonograph man carried his machine out on the deck where the people sat about listening to it. The music sounded better than inside.

At divine service there was a full house --almost. Three U.S. teachers still insisted on having their meals brought up on deck.

In the afternoon the sky clouded over and next morning (July 24) the rain fell in torrents. By about 10 o'clock the shore of Australia was seen on the port side. It seemed to be high cliffs of sedimentary rocks. Upon them were houses with the inevitable red roofs.

As we proceeded the north wind increased in violence and the ship rolled vigorously. At last we passed between the Heads and the sea became quieter, as the pilot came out. Three barefooted men rowed him over to the side of our ship and he clambered up a rope ladder to the lower deck. Then the ship steamed ahead and at last, at about 11 o'clock, tied up to her dock. The rain fell in pailfuls as we walked down the gang-plank. We waited until our baggage was carried into the shed and arranged for a "Turpie" man to take the trunks up to the Hotel Metropole. We took a taxi, with our hand baggage, direct to the hotel.

We were in Australia!

( May 30, 1951 )



#### 4. Across Australia and along the West Coast.

##### Assembling the Eclipse Expedition

Thus on Monday, July 24, we found ourselves in Sydney, the great metropolis of New South Wales.

The chairman of the local committee which was arranging for the eclipse expedition to the North-west Coast was H.A. Hunt, the Head of the Commonwealth Weather Bureau, then located in Melbourne, the temporary federal capital while Canberra was being established, and Commander H.L. Quick was his chief assistant.

When we were in New Zealand I received a cable from Mr. Hunt suggesting that my party wait in Sydney until W.W. Campbell and the other members of the Lick Expedition should arrive there, which they expected to do on August 4 by the <sup>ship</sup> s.s. Tahiti, sailing from San Francisco.

This would have been a very pleasant arrangement, but Dr. Young and I wished to construct some apparatus in the time at our disposal, and I replied that we thought it would be most advantageous for us to go on to Adelaide, in South Australia, and join the other members of the expedition when they should overtake us at that point. However we intended to spend a week in Sydney and some days in Melbourne. At that time we did not think of receiving any special entertainment in any of these places.

##### Liquid Sunshine

A feature of Sydney at this their winter season was the rain. Of course it is related to its position on the surface of the earth, lat.  $33^{\circ} 52'$  south, long.  $121^{\circ} 23'$  east, and its distance from the sea. I find that in June is the heaviest rainfall, 5.18 in., and that the total for a year is 48.00 in., which is nearly the same as for



Montreal.

Almost every day there were smart showers in the morning. Then they would cease, the clouds would quickly vanish and the sun would burst forth. In jokingly defending the precipitation some of our friends spoke of it as "liquid sunshine". However, each of us had goloshes and umbrellas near at hand, and we did not suffer from the wet.

### Banks and Newspapers

Our good travelling-friend Mr. Mason introduced us to Sydney. I had brought with me a letter from a fellow-member of the U. of T. Faculty (Wasteneys) to C. Brunsden Fletcher, the editor of the Sydney Morning Herald, so to him we went first. He was not in his office. Then to the big Bank of New South Wales, where we met two of its head officers, Mr. Robinson and Mr. Broughton, both personal friends of Mr. Mason. Then we went to the Commercial Bank, where I had an informative chat with the accountant, who incidentally was well-informed on eclipse phenomena. I opened a temporary account and got some blank cheques. Then we went back to the Herald office and had an agreeable visit with Mr. Fletcher. I found he was the author of a book entitled "The New Pacific" (1917) which is full of information on the Pacific islands and how the disagreements arose among the great powers, Great Britain, U.S.A., and Germany. Mr. Fletcher presented a copy to "Mrs. Chant with the best wishes of the Author", and it has an honoured place in my collection of books on Australia.

### Newspaper Interviews

Mr. Fletcher asked me to give an interview to a member of his staff (Mr. McGregor) and to sit for a photograph. We had an



extended conversation regarding our expedition. It included many fairly technical matters, but next morning there appeared in the Herald a column-long report, accurate in every detail.

On the following day Dr. Young was treated in the same way. He gave the newspaper writer much information regarding the great observatory at Victoria, B.C. Now it so happened that amongst the cabled news which came to the paper the previous day, there was an account of the discovery by J.S. Plaskett, the director of that observatory, of twin suns 52 quadrillion ( $52 \times 10^{24}$ ) miles apart, and the most massive pair on record. Dr. Young was asked about this, and being on the staff of that institution and knowing perfectly how this result was obtained he was able to explain the significance of the news. ~~The news~~. The newspaper had an accurate and interesting story.

The Herold started as a weekly newspaper in 1831 and became a daily in 1840. It had a high reputation and I am sure deserved it.

#### Research in Pure Science

A day or two later one of the Herald writers asked me to discuss with him the practical value of research in pure science, for example, what we were engaged in. I was able to give him a number of striking examples of its outstanding value. These he dressed up in plain language and put in his paper next day.

First, I referred to Captain James Cook, who set out to observe the transit of Venus, in 1769, on the island of Tahiti. His ultimate aim was to make some observations of the planet Venus and the sun, from which the distance of the earth from the sun could be deduced. To most people this quantity has no significance



whatever; it is the purest of pure science. Having accomplished his main object, Cook explored New Zealand and re-discovered Australia which then became a British possession.

In 1868 parties of British and French observers went out to India to observe a total eclipse of the sun. Shortly before this the method of spectrum analysis had been discovered. From the spectrum of the eclipsed sun observed in India it was concluded that there was a substance in the sun which was unknown on the earth and to it the name helium was given. Not until 1895 was this substance discovered on the earth. Now it is commonplace and has a thousand uses.

About 1830 Faraday discovered electric induction, which for many years was considered of little more than academic value; and yet from it has grown all the immense commercial applications of electricity.

Then Maxwell, following in Faraday's steps and guided by mathematical methods, deduced the existence of electric waves. About 25 years later Hertz demonstrated experimentally the existence these waves, and that soon led to the development of wireless telegraphy.

From J.J. Thomson's study of the passage of electricity through gases came the thermionic valve and wireless telephone broadcasting.

At the end of 1895 Roentgen discovered the x-rays. He was not seeking for anything "practical", but these rays have had incalculable value in medicine and have also application in industry.

We then turned to Einstein. All scientific research, I said, is based upon some theoretical foundation. There will be no rationally



carried out research without a theory of some sort to guide one's thoughts; and if there are errors in the fundamental principles on which our theory is based we shall ultimately arrive at contradictory results in our research. Such contradictions do occur, notably in endeavouring to explain various optical phenomena. The Einstein Theory was developed to remove what may be wrong in our fundamental ideas and assumptions. We aim to determine by our expedition if the Theory is valid.

A change in the method of thought—for example, the Copernican theory in astronomy, or the theory of Evolution in biology—is of more importance than a political revolution.

#### Sydney University

Next day we went to the University for lunch, the invitation for which had been delivered by Prof. O.U. Vonwiller (Physics). I was pleased to meet Prof. Vonwiller, as twenty years earlier we had both made researches on electric waves carried by wires. It was an enjoyable gathering. Along with us there were H.E. Barff, Karden and Registrar; Prof. W.E. Cooke (Astronomy); and Miss Fydler of the Women's Union.

We were shown the buildings. The massive block known as the Main Building includes the Great Hall and the Library as well as lecture rooms. Its main facade is 400 feet long and it is built of stone, as are all the other mighty structures of the city of Sydney. The stone for them was obtained in the immediate neighbourhood. The Main Building is described as an excellent specimen of the Elizabethan Style. It made me think of our own University main building in Toronto, which originally contained within its walls the Library and



the Convocation Hall. The Reading Room of the Sydney Library was large, well-lighted and comfortable. Of course there were other buildings too, the Medical Faculty being specially favored with lecture rooms and laboratories. The Sydney University was incorporated in 1850 and opened in 1852.

Present at the luncheon for a part of the time was Sir T.W. Edgworth David, the distinguished professor of Geology. He asked my party to go to his lecture room after the luncheon. There he gave us a charming "lecturette", illustrated with lantern slides, on the interior of Australia. He showed us what we might expect on our expedition.

#### A Toronto Immigrant to Australia

A colleague at the U. of T., Professor Baker (Mathematics), asked me to call upon William Lewis, an old schoolmate of his who had been living in Sydney for many years. I found that his place of business was 316 Pitt Street, one of the main streets, and Dr. Young and I went there. He was pleased to see us. Mr Lewis was a brother of Richard Lewis, the well-know principal of Dufferin School and the author of a book entitled "How to Read", which was one of my text-books when I was at the Model School in Parkdale in the autumn of 1883. Near the end of that session I attended a meeting of the Toronto Teachers' Association, which was held in the school-room of the Carlton Street Methodist Church, at which Richard Lewis gave an example of reading by presenting the Trial Scene from the Merchant of Venus. I thought it well done and I tried it myself on a Young people's meeting when I was in Ottawa in 1891.



Mr. William Lewis said that he and "Al" Baker were students at the Toronto Grammar School in 1861. The old school building was a frame structure at the N.E. corner of Stanley (Adelaide) and Nelson (Jarvis) streets. The Headmaster was Michael C. Howe, LL.D. of Dublin, from 1854 to 1863. The mathematical master then was Archibald MacMurchy, who was Headmaster from 1872 to 1890. Lewis said he saw Howe afterwards in Australia, where he died about 1875. Lewis wished us to go to his home in one of the suburbs but we could not find the time.

#### Amateur Astronomers, and the State Parliament

After lunch we called to see W.F. Gale in his exalted office of Manager of Government Savings Banks, and he took us over to see Mr. Brown, a lawyer and an active amateur astronomer. The latter had a photographic telescope similar to the Harvard Map of the Sky instrument.

Then we came back to the hotel, where Mrs. Fletcher and Mrs. Wilcox were. Mr. Mason took us all for a drive through Centennial Park and also to the Parliament Buildings. Here he introduced us to quite a number of members, and we were given seats on the floor of the House. We listened for half an hour and then the Premier, Sir George Fowler, left the chamber. We followed him to his office and had a very pleasant conversation with him. He was very cordial.

In <sup>the</sup> early evening Mr. Brown came to our hotel and we had an interesting hour's talk. Then he and Young and I drove to pick up Gale who had been dining out and then we all went to Gale's house, on Carrington St., in a suburb. Young and I were impressed with



his telescopic outfit. He had an 8-inch Grubb refractor, new and excellent; and a 17-inch <sup>n</sup>reflector of his own construction. We observed Mars, <sup>alpha</sup> Centauri (double), <sup>gamma</sup> Crucis ( a close double ), a loose cluster near <sup>K (Kappa)</sup> Crucis, a very red star near <sup>gamma</sup> Centauri, <sup>eta</sup> Argûs and the "coal Sack". The sky was not very good and clouded over by 10 o'clock.

Brown drove Young and me to our hotel and then went on ten miles to his home.

Friday, July 28 - Australian Museum

Following the clouding up of the sky when we were observing with Mr. Gale's telescopes, rain was falling in the morning. That however did not prevent Sir Edgworth David from calling to take us to the Australian Museum. However Dr. Young and I were not free to go then and so Jean and Bessie only went with him.

We were anxious to start for home as soon as possible after the eclipse, and I had reserved berths on the Tahiti <sup>a</sup>ailing from Sydney for San Francisco on October 12. I had just received from Commander Quick the provisional itinerary of our expedition and found that we could not get back to Sydney by Oct. 12, so Young and I went to the steamship office and obtained again the accommodation which we had previously reserved on the <sup>ship</sup> s.s. Niagara.

Then we went to the Museum. Dr. Anderson, the director, conducted us through it. The museum had been long established, having been incorporated in 1853 and the collections were excellent. There were some most interesting birds and animals. I saw the Platypus, or Duck-Bill, about the size of a small musk-rat, which was the oddest of all; but the Birds of Paradise were very beautiful



and the Bower Birds were very pleasing.

In the evening we went to the Carlton Hotel to dine with Mrs. Craig, our generous friend from Auckland, who with two daughters had been there for about three weeks. Besides ourselves (4) and the Craigs (3) there were Mrs. Davis and her daughter who was a senior at the Sydney University. It was a very pleasant occasion.

### Sydney Harbour

Ever since our arrival in Sydney I had been hoping to obtain a close-up personal acquaintance with the wonderful harbour, and the opportunity came on Saturday afternoon. Rain and sun alternated in the morning but from one o'clock the sky was clear.

In 1922 if one wished to cross from the south or business side to the north or residential side of the harbour one had to take a ferry-boat, and practically all such started from Circular Quay which was at the foot of Sydney Cove. For years a great bridge was planned and at last it was undertaken, and completed in 1932.

About 2 o'clock we met the Fletchers, Wilcoxes and half a dozen others at the Circular Quay. I cannot remember all who were present. There was a Methodist parson named Prescott who had a boy's school, another parson, Mr. & Mrs. Lusby, Mr. and Mrs. Parker and others.

We took what was known as the Lane Cove trip. Moving out of Sydney Cove, we passed round Dawes Point from which the mighty Sydney Bridge springs, to land at Milson's Point, 3770 feet away across the water, and went westward towards the entrance to the Paramatta River. We passed Greenwich, Woolwich, Northwood,



Longueville, Garricks, and came to Riverview, where we had a look at the imposing St. Ignatius College (Jesuit), a boy's school with about 125 pupils. At it was the famous seismograph of Father Pigott which he was pleased to show us. Then we went across the river to a picnic place. The whole route was full of interest and beauty. The launch was continually turning to right and left into caves and bays.

I had a good talk with two or three of the party and found them very intelligent and agreeable people. Even among them there was a curious jealousy of Melbourne. One of the women thought I would like Sydney better than Melbourne, though she acknowledged that Melbourne was a beautiful place. She also asked me if I did not think Sydney harbour a fine one. One of the parsons told Bessie a story of the visit of some U.S. sailors to Sydney after the war. They were entertained to refreshments and some drank too much. One slept out in the Domain, and in the morning a policeman went up to him and tried to waken him. He rolled over and glanced up and said, "Iss all ri', I've seen yer harbour".

#### Farewell to Sydney

As usual, there was intermittent rain next morning, but Mr. & Mrs. Fletcher called and went with us to St. Stephen's Presbyterian Church on Phillip St. The preacher was John Ferguson, who had occupied the pulpit for 28 years and the congregation was going to celebrate the occasion. He gave a thoughtful sermon.

After lunch Prof. Vonwiller, his colleague Mr. Booth, and Miss Booth; also Sir Edgworth David, Lady David and Miss David, came in two motors and took us for a long and interesting drive. During it we enjoyed the ceremony of afternoon tea at Pennant



*above*  
Hills, 11 miles N.W. of Sydney, where Cooke's astrographic telescope had been mounted.

Then we came back to our hotel where we said good-bye to the Davids. Our other friends (Vonwiller, Booth) came with us for supper, after which Vonwiller drove us to the station and helped us on the train -- in car 3, compartments F and G. The train left at 7.25 p.m.

Our engine seemed to me small and it had a shrill whistle, but it pulled us steadily along at high speed. The gauge of the railways of N.S.W. is the "standard", which is 4 ft. 8½ in.; but unfortunately there is variation in the other states.

The railway station Albury is on the Murray River which there is the boundary between N.S.W. and Victoria, 392 miles from Sydney. We reached it in the morning and had to change cars as the gauge of the Victoria railways is 5 ft. 3 in. We had breakfast there, 2 shillings.

Our new accommodation was first class and comfortable. Indeed all our transportation in Australia was supplied free by the Federal Government and was excellent. The country was picturesque with many hills to the east and some to the west and always the valued eucalyptus trees.

We reached Melbourne, 190 miles from Albury, at 12.51, and were met at the station by Commander Quick and Mr. Hunt. We arranged to leave our trunks at the station and then all walked to the elegant Menzie's Hotel.

After lunch we went over to the Commonwealth Meteorological Office and Mr. Hunt showed us some of his models to



illustrate weather conditions, and also a temperature-recording instrument to be used at Wallal at the time of the eclipse.

Then he took us for a drive about the town and to his home for afternoon tea. We were pleased to meet his wife and two grown daughters, but sorry to learn of the recent death of his eldest daughter.

In the evening Prof. T.H. Laby (Physics) called to see us. His name was familiar to me as co-author of "Physical Tables" by Kay and Laby. He was an Australian but had had graduate training in Cambridge, England.

#### The City of Melbourne

Of course we were impressed favourably with Melbourne. Its wide streets, carefully surveyed at right angles, with its massive public buildings of good architecture, its fine parks and well-kept public gardens, gave it an air of soberness and stability as well as of stateliness and dignity.

The city is on the Yarra River about five miles from its mouth and much of its shipping was done from Port Melbourne,  $2\frac{1}{2}$  miles to the south. There were cable cars and electric trains serving the city and its suburbs, the total population being given as 743,000 - somewhat less than that of Sydney.

It was in 1856 that "responsible government," with two Houses of Legislature, was organized in the province of Victoria; while on Jan. 1, 1901, the various Australian colonies became States and all were federated into the Commonwealth of Australia. At that time Victoria offered its magnificent Parliament House for the accommodation of the federal Senate and House of Representatives until the Commonwealth capital at Canberra could be



established and buildings made ready for occupation. On May 8, 1927, the Australian Parliament was opened in the new buildings. In the meantime the Parliament of the State of Victoria made use of a portion of the great Exhibition Building which had been prepared for them.

Tuesday, August 1. As we expected to spend only three days in Melbourne we had to leave unvisited many noted features of the city, especially its parks and beaches.

August 1. Commander Quick called to explain to us the arrangements for getting to Wallal; and then all of us went to the Botanic Gardens. They were instituted in 1846 and are on the south side of the Yarra River. Their area is about 100 acres and they include beautiful lawns, small lakes and, what pleased me greatly, palm grounds and plantations of Australian and New Zealand vegetation. I was surprised at the wonderful display of date palms in the parks and gardens in latitude  $38^{\circ}$  south. In a pond there were wild duck, swans and water-hens moving about, very tame. Also we saw a big black swan with cygnets.

From here I went to the University to join Professor Laby who took me over to lunch. I met several of the faculty, - Love, Glasson, Wallace and others. Glasson was a friend of D.A. Keys and Wallace knew R.M. McIvor<sup>2</sup> who went from the U. of T. to Columbia.

Then I went to the Observatory, which was located on a  $4\frac{1}{2}$ -acre site in Domain Park, about a mile south-east from the centre of Melbourne. In earlier years the observatories of the different colonies of Australia were important active institutions and, along with the Cape of Good Hope and Madras observations, did



their part in observing the southern skies.

I was received by C.J. Mirfield, acting Government Astronomer for J.M. Baldwin who was absent attending ~~(I believe)~~ the First Meeting in Rome of the re-organized International Astronomical Union. I met there Sir Thomas Lyle, formerly professor of Natural Philosophy in the University, and Messrs. Moroney and Hosking. We had afternoon tea (Miss Mirfield presiding) and there was quite a show of wine, lager and whiskey which, however, was little patronized.

The astrographic instrument (Grubb), 6-inch refractor, and 8-inch meridian circle I thought of high quality, but not much work was being done with them. There was much material ready for publication but the money for printing it was not available. I think the individual colonies took more pride in this pure astronomical work and that greater progress was made than when under federal control.

I was greatly interested to see the old 4-foot reflector made by Grubb in 1868 and which used to be pictured in all the popular books on astronomy under the title, "The great Melbourne Telescope." It was housed in a building with a sliding roof. I was told that it was never satisfactory, that there was flexure in the lattice-tube and that the mirror was not too good. By the way, there <sup>were</sup> ~~was~~ two of these 4-foot mirrors, made from speculum metal, with a hole in the centre <sup>of each,</sup> as the telescope was of the Cassegranian type.

But I believe the big telescope was employed for many years after 1869 in the revision of the nebulae and clusters observed at



the Cape of Good Hope by Sir John Herschel 1834-38, and that the results obtained were as satisfactory as the committee of the Royal Society of London, on whose recommendation, supervision and approval the 4-foot Cassegrainian was constructed, could have expected.

Most of Sir John Herschel's southern nebulae, I learned, had been examined; and many hundreds of drawings of these objects, with notes and micrometric measurements, were stored in the observatory, but there had been no opportunity since 1891 of arranging this material for publication.

In view of what has been achieved in later years, it may be interesting to state that photographs of star fields were attempted with the Great Telescope but without success. It was not possible to guide the telescope accurately enough for a long exposure; but in the case of the moon, where the exposure was from one to three seconds (with wet plates) excellent results were obtained. They were considered among the best up to that time.

The Great Melbourne Telescope had an honourable history.

August 2. One of Sir Thomas Lyle's great achievements was the construction of a ruling machine, and he called for us and took us to the University to see it. It was a beautiful instrument. He thought the screw, on the accuracy of which the value of the machine depends, was perfect; but he had provided for any irregularities. The long nut, which moves along the screw, carries the plate which is being ruled; to it one end of a rod is attached and the outer end slides along a 'way' about four inches from the nut. The upper surface of this 'way' can be altered to balance the irregularity.



He had made some good gratings, but the limits of the machine were rather small. It could rule a surface 5 inches wide with lines  $3\frac{1}{2}$  inches long. Instead of the ordinary speculum metal, cu+sn, he had found a combination of cu+sn+ni more satisfactory.

*Jean and Bessie went out to Toorak (4 miles) for afternoon*  
In the afternoon, tea with Lady Lyle; Young went to the Observatory to plot the stars near the sun at the time of the eclipse, and had a pleasant visit; I stayed at home and prepared an article for a Toronto newspaper, which I revised in the evening.

We had heard of the two big bookstores in Melbourne, both on Bourke St. and could not resist paying a visit to them. The first was kept by Andrew Henley who said *his collection contained* ~~there was~~ a million books (in his collection.) The other was Cole's Book Arcade and seemed equally large. Daughter picked up a book on Australian Natural History, but we thought the prices were high enough. While in Australia I managed to secure copies of Handbooks published by the Federal government and the various State governments on the occasion of the meeting of the British Association for the Advancement of Science in Australia in 1914, as well as some other government publications which contained much trustworthy information about the country. I have quite a library of *books relating to* Australia.

August 3. In the morning we visited the wonderful Botanic Garden again and obtained photographs of the rows of palms in Alexandra Park and on St. Kilda's Beach. But besides the palms and other sub-tropical trees and shrubs peculiar to Australia there were many imported from other parts of the world—even the crooked-stemmed Manitoba (labelled "Canadian") maple was amongst them.

The Melbourne Herald called on Young in the morning to ask him to write an account of our expedition for them and got him to



sit for his photograph; and about 3.00 p.m. the manager came to see me and asked me to send telegrams and letters and keep them fully informed and he would consider them as coming from an "eminent scientist".

Then having settled our accounts we walked down to Spencer St. Station and soon found our car for Adelaide which is 483 miles away. The sleeping-car accommodation was excellent. The car had 10 cabins, which were entered <sup>by one</sup> ~~at an~~ end from a narrow corridor along one side of the car. At each end of the car is a space, one for the ladies, the other for a smoking-room for men. Each cabin had two berths, as on board ship, with a wash-basin, and a wardrobe for one's clothes.

The train left at 4.30 p.m. It was very comfortable and maintained a good speed. Dinner was served on the train, 4/— This was a wide-guage 5 ft. 3 in. road and of the first - class.

In South Australia

Adelaide was reached at 10.10 a.m. Some ten miles before one comes to the city the railway surmounts a range of hills (which include Mt. Lofty, 2334 ft.) and there is revealed a beautiful view ahead. There were many white blossoms which I could not recognize. They were not cherry or pear blossoms, the trees were not just the right shape. I inquired and found they were almond trees. There were many fruit orchards and vineyards in the neighbourhood.

The country between Melbourne and Adelaide was very pleasing. There were many fine buildings and I concluded that the soil was good. At this time the fields were green. The rainfall here I



learned is 21 inches and it falls mostly in the winter (Apr.-Nov.). I was informed that six months later the foliage was not so attractive.

On the journey from Melbourne a R.C. priest got on the train at Ararat in Victoria, and in conversation with Dr. Young asked about the Einstein Theory. After Young had offered some explanation he said: "I thought there was something wrong with the theory of gravitation. I thought one would not get so tired walking up a hill if it was due only to the earth's attraction".

Prof. Kerr Grant (Physics) was at the station to meet us and drove with us to locate a place to stop at, as we were to spend nine days in Adelaide. We were not very successful, but ultimately settled at "The Gresham", near the station, at 7/- a day, bed and breakfast, quite a common formula at this time.

Before lunch Young and I went with Grant to his laboratory and put the work we wished to have done into the hands of Rogers, his machinist, who undertook to get everything ready for us. In the afternoon at about 4 o'clock we went out to Grant's home on 4th Avenue where we were very kindly received by Mrs. Grant and a neighbour Mrs. Cook, whose husband was professor of Chemistry. After drinking tea and happy chatter we went out into the big garden and picked mandarins and lemons off the trees, and we carried home arms' full of flowers! In the meantime Bessie had been invited to a party at the University in the evening.

### The City of Adelaide

The province of South Australia was established in 1836 in a regular systematic procedure through British Government Colonization Commissioners. The choice of the site for the capital



and the planning of it had been entrusted to Col. William Light, the first-appointed Surveyor-General, who had rendered distinguished service under the Duke of Wellington. He met bitter opposition in his proposals but he had been given the authority and carried out his plans. Posterity vindicated his judgment and erected monuments in his honour.

The main streets are wide and on the rectangular system. King William St., the central main thoroughfare is 132 feet wide and runs north-south. Encircling the city is a belt of park lands almost a mile wide and the abundance of trees and shrubs, together with its splendid public buildings, render the city very attractive. Its population in 1922 was 250,000, which as usual was about one half of the population of the state. It was not as large as Sydney or Melbourne, but it had a peculiar distinction of its own.

I noted that the street-car service was much like our own in Toronto. It used the overhead trolley and the cars were similar in construction to ours. The passenger pulled a rope to stop the car: not so in Sydney or Melbourne. Also, there was a: "Motorman" and "Conductor", "Fares please" and "Cars stop here"; and many people hanging on to the straps!

On Saturday afternoon we went to Henley Beach,  $6\frac{1}{2}$  miles west of the city, on the ocean shore. It gave us pleasure to walk on the beach and pick up shells and other things from the sea.

While there we saw a ship out on the big water. Its mast, funnel and the smoke from it could be seen but not the <sup>hull</sup> hull — oft-quoted clear evidence of the rotundity of the earth. I recalled that a flat-earthier whom I met when I was a student stated that



one could not navigate the southern as we did the northern hemisphere. Our recent experiences showed that such statements were plain rubbish!

Sunday was a bright sunny day. In an early walk we admired the wide streets and the substantial buildings, but there was much dust and dirt which the wind blew into the air. At the Methodist Church on Pine Street at 11 o'clock we listened to the minister J.P. Jenkins, who spoke well and with good doctrine on "Ye are the salt of the earth, <sup>etc.</sup> ~~ie.~~" The congregation was not large and the majority were men.

The street-cars did not run in the morning but were going as usual in the afternoon. Then we visited the Botanical Garden. It was very good but not so fine or well-kept as that at Melbourne. There were wild ducks and marsh hens as usual. We walked through into the Botanic Park where the Salvation Army, with its fine band, was holding a meeting. "Ambassador" Booth was in town, stirring up an evangelical revival. Also holding forth were several soap-box orators, keeping up the British tradition of personal liberty, but the Army with its music drew the crowd. The band was excellent and the cornetist very superior.

Dr. Young and I spent much time at the University preparing the photographic plates for use at the eclipse camp. On the way to the University on Monday morning (Aug. 7) we met Sir Henry Barwell, the premier, and his finance minister, Mr. George Ritchie. The premier invited us to lunch in the Parliament House at 1 o'clock. At that hour we were there and we had a pleasant time. The liberals had a majority of 5 over all others in a House of 46. The Council



had 20 members. Barwell considered it a "safety value" against hasty legislation.

Later in the afternoon, with some of our new friends, we boarded a "Paradise" car and went out in the country to Mr. Pike's orange farm (or grove). It was a pleasing sight, with the trees full of fruit. There was a fine 80-year-old orange tree well loaded; also trees of other kinds, lemons, apricots, peaches - but I believe not grape-fruit. Their use had not spread so far at this time.

#### Beautiful Mount Lofty

The most pleasing excursion from Adelaide is to Mount Lofty. To the summit it is ten miles in a direct line and twice as far by road. We were there three times. On Tuesday afternoon Sir Henry Barwell's car, including Lady Barwell, came and carried my party (3) thither. On the top is a tower to the memory of Captain Matthew Flinders who made many accurate explorations about Australia and visited the summit in 1802. Indeed his records definitely fixed Terra Australis as a British possession and that the proper name for it was Australia. On the way down we had afternoon tea and enjoyed wonderful views of the city and the surrounding country.

Next day our full party (4) at 2 p.m. took train to Mount Lofty on the invitation of Lady Stirling, the widow of Sir Edward Charles Sterling, the distinguished professor of physiology in the University of Adelaide. We were met at the station by a Miss Stirling and drove up in a wagonette. The house and gardens were wonderful. Terrace after terrace on the hillside were filled with



native and foreign trees and shrubs. An abundance of Wistaria in bloom added to the beauty of the place. Lady Stirling had three daughters. One was the wife of Prof. T. Brailsford Robertson, the successor to Sir Edward Stirling at the University and who was on the staff of the University of Toronto for some time. Dr. and Mrs. Robertson and a Miss Warwick as well as ourselves (4) sat down to an elaborate dinner. We took train for home at 8.22 p.m. and the passage required 1<sup>h</sup>. 5<sup>m</sup>. A charming visit!

After much labour Young and I completed the standardization of our photographic plates. Also, the new apparatus had been made in the University workshop and we had it packed up and taken to the R.R. station for shipment along with ourselves. The Railway authorities were very courteous and obliging.

#### Arrival of the Lick Party

On Friday morning (Aug. 11) the Lick Observatory party arrived. It included W.W. Campbell and Mrs. Campbell, J.H. Moore, C.E. Adams and Mrs. Adams of New Zealand; also Commander Quick and some of his men. Young and I were there and I was the first to shake Campbell's hand and to introduce him to Professor Grant and the others. There were many "movie" men and other photographers about.

At 12 o'clock there was a reception by the Lord Mayor, Right Honorable Lewis Cohen, J.P., at the Town Hall. A large gathering of notable citizens were present. Short speeches by the Mayor, Prof. Mitchell and Sir William Sowden, <sup>the latter being</sup> President of the Public Library Board, welcomed the visitors and Campbell replied. Then I was called on and offered a few remarks.



After this we went to a meeting of the Commonwealth Club (much like our Canadian Clubs). About 300 were present. Next to the president (on right) was Dr. Campbell, then Dr. A.A. Lendon, then I, then Hayter Reid. Campbell made a good address, in which *he* showed how the gift of Lick had enriched the astronomical world. He spoke of the reason for the number of large observatories on the Pacific Coast and suggested that some one in Australia might do as Lick did.

Then Young and I visited the Observatory and Mr. Madden showed us about. There was a 6-inch meridian circle with a Riefler clock, and clocks for the wireless time service; also an 8-inch Cooke equatorial (not much used) and a Milne seismograph. *The staff was collaborating with W. E. Cooke of Sydney* on determining star positions for the astrographic chart.

At 3.30 we went to the Lieut. Governor's garden party, but rain forced us to gather in the house. I met a large number of interesting people. Our host, Sir George Murray was chancellor of Adelaide University. Professor Naylor asked to be remembered to our president, Sir Robert Falconer, whom he had met at university conferences. Prof. W. Mitchell (vice-chancellor) had taught Falconer Kant's Ethics in Edinburgh, 30 years earlier. Prof. E.H. Rennie (chemistry) had been in Toronto in 1876 on his way to England where he spent five years with E. Frankland and H.E. Armstrong. At the reception was Rev. J.K.F. Bickersteth, brother of J.B. Bickersteth, warden of Hart House, University of Toronto. After we had said good-bye to the Lieut-Governor and Miss Murray (sister), Bickersteth drove us out to St. Peter's College, a high-class secondary school of which he was head.



We were brought back by 5.20 when Bessie was to meet Dr. Mayo and visit the Children's Hospital five miles outside the city.

### Last Day in Adelaide

We had been warned that there might be poisonous snakes at our camp. I went to a shop in Gawler Place and asked for leggings. I told the clerk that a friend had got a pair the other day. He said, "A Canadian young lady." I said "My daughter." He said he was an Englishman and that he found the houses in Adelaide cold for a long time, but that he had become acclimatized. I got the leggings, but we did not see a snake!

On returning to the hotel I revised an article for the Melbourne Herald which I had written the previous evening.

In the afternoon the visiting astronomers gathered at 2.15 at the King Edward <sup>S. Capt.</sup> VII monument, and were taken in private automobiles for a drive to the mountains. I was in Justice Parson's car, and another passenger was a Mr. Adamson of Manchester, a botanist, who was a fellow-student in Manchester with <sup>H</sup> B. Speakman of the Ontario Research Foundation in Queens Park, Toronto. Such meetings far from home are very pleasant. Our ultimate point of convergence was the wonderful 'castle' of Sir Langdon Bonython on Mountain Lofty. This gentleman was said to be a newspaper owner and his magnificent establishment, in a lovely garden with many strange shrubs and flowers, was well worth a visit. There was a great display of refreshments. Exceptionally good trifle, oyster patties, fruit salad and some 54 other varieties. Adams and I thought it only proper that we should sample a fair number of these delicacies!



We got back to our hotel at about 5.15, and at 6.15 a car was at our door to take Young and me to Bickersteth's for dinner. On the way we picked up a Mr. Bishop, a 6ft. 2 in. Englishman, and then went to St. Peter's College. The dinner was a happy occasion and we signed the <sup>V</sup>isitor's Book. Bishop had been brought up near Greenwich and was well imformed about the Airy's, Christie's, and the others of the Royal Observatory.

A car called at 8 o'clock and took us to the University, where W.W. Campbell was to give a lecture. Young and I had trouble to get into the hall as we had no tickets, but after a little explanation we were admitted, and I found I had a reserved seat next Miss Murray (Sir George's sister).

Campbell spoke very well. He went into details about eclipses in general and the conditions of this one in particular. His references to his colleagues and those going along with him were judicious and generous. The people declared it a great treat to have such a distinguished visitor speak to them.

#### Across Nullarbor Desert

We were scheduled to leave Adelaide on Sunday, Aug. 13 at 10.45, and at 10.30 the party had gathered, including Prof. Grant, Mrs. Mary Vivienne who had brought me a copy of her valued book "Sunny South Australia"; also G.F. Dodwell (Government Astronomer) and Mrs. Dodwell, just home from attending the International Astronomical Union at Rome. A few minutes late, we started on our western journey.

At first we travelled on the broad-guage (5ft. 3in.) track and our compartment was the "best ever"; but at Terowie (140 miles, 3.40 p.m.) we changed to 3 ft. 6 in. line. Car not



quite so large or so comfortable. At 6.30 we stopped at Eurelia and the passengers got out and had dinner served them at long tables lighted by oil lamps, 2/6 each. It was a pleasant change. After a halt of 25 min. we started forward again, and at 10.05 we reached Port Augusta, 260 miles from Adelaide, where we boarded the Trans-Australian line, which is of standard (4 ft. 8½ in.) gauge. Its length from Port Augusta to Kalgoorlie is 1051 miles, and its equipment was comparable to the best in Canada. In the lounge-observation car there were two writing tables and a piano.

### Crossing the Desert

Each day on the trans-Australian Railway I set my watch back 45 minutes.

At about 8 a.m. Monday we stopped at Tarcoola (257 mi.) where there were tailings from gold mines; and loitering about the railway four or five natives were to be seen. They were ill-clad and dirty-just as seen in photographs.

At Ooldea (427 mi.) we were delayed 1½ hours, waiting for the east-bound train. This station is not far from the edge of the Nullarbor Plain (Lat. nulla arbor, not a tree) so named by the surveyor Delisser. It is about 450 mi. E-W and 250 N-S at its widest place. It is level as the sea and has salt-bush and blue-bush growing sparsely over it. For a single stretch the railway runs 300 miles without a curve. About three miles from the railway is a soak, which for decades has been known as a perennial source of pure water. During the building of the railway it was a great comfort, although it did not satisfy all the



needs. Water obtained in deep borings in this part of the country is salty.

About a mile from the soak lived in a tent a widely known woman named Daisy Bates. I had been told about her by one of my colleagues at Toronto who had attended the meeting of the British Association for the Advancement of Science held in Australia in 1914. Mrs. Bates had been at the sessions which were held in Adelaide. She was a self-appointed protector of the aborigines and indeed had a remarkable life. Her experiences are given in "The Passing of the Aborigines", published by Murray in London in 1938.

At Cook (513 mi.) we stopped from 6.20 to 6.35 p.m.; ~~4~~ <sup>a</sup> divisional point in the middle of the desert. There was a settlement of perhaps 400 people living in corrugated iron houses. They were mostly connected with the railway. I noticed a derrick here which, I was informed, was being used in drilling for water. Several natives were standing about, apparently hoping for a hand-out from travellers. They were bare-footed women in ragged clothes.

Deakin (599 mi.) is just within Western Australia, which indeed includes one-third of the great continental island.

Next morning at 9.30 we reached Karonie<sup>e</sup> (982 mi.) and on looking out I saw a fairly large gum tree. There had been a heavy shower during the night and there was a tinge of green to be seen over the land. Two hours later we were at Parkeston (1049 mi.) near the end of the Commonwealth line. Here were great dumps from



mines and a village of perhaps 400 people. In a garden I saw some vegetables which had a peculiar blue-green colour. All around was the same old red soil, apparently rich enough if moisture is supplied to it.

### The Golden Mile and the Capital of the State

Kalgoorlie<sup>e</sup> (1051 mi.) was reached at 11.45 a.m. (Tues., Aug. 15). We were met at the station by Mayor Burton and others and we walked to the Town Hall, an imposing building. We laid off our wraps in the Council Chamber and then in an adjoining room we sat about a table laden with bottles, strong and weak, and plates of biscuits. The Mayor made an excellent speech and wished us good weather.

Dr. Campbell replied at some length. He said there were some Canadians in the party but it would be difficult to distinguish them from the United States members. He explained our objects in observing the eclipse and acknowledged the great reception we had received in New Zealand and Australia.

The Mayor asked if some one else wished to speak and Dr. Campbell and others told me to do so. I said a few words of appreciation of our reception, of their fine city here; and referred to our similarity to U.S. citizens and to the pleasant British atmosphere about us. I also brought greetings to the great Commonwealth from a sister Dominion.

We now drove to the Kalgoorlie<sup>e</sup> race-track, of which the city was very proud. We admired the profusion of lovely green grass and shrubs and flowers, and were informed that before the availability of the water supply, which is pumped from a reservoir 350 miles away, the course was as barren as the Nullarbor



Plain. The water used, I learned, cost the Racing Club £1200 a year.

We had a fine dinner at the Palace Hotel, 4/-each.

At 2.45 carriages called for us and took us over to the friendly-rival city of Boulder, which is on the other side of the "Golden Mile". The streets in both cities were wide and upon them were many pepper trees. Here was another reception, with Liquid and other refreshments. Mr. Rainsford was acting mayor and cordially welcomed us. Dr. Campbell replied but not at so great length. The Boulder race-course was as fine as that at Kalgoorlie and the horses ran on turf.

Next we were driven to the Ivanhoe Mins<sup>e</sup>, one of the famous ones in the "Golden Mile", so named on account of the great amount of gold being produced within a square mile. We were shown the power house and the stamp mill, and we also saw the men coming up out of the shaft in a two-story elevator carrying 8+8 men at a time. The mine was 3628 feet deep. One of the miners took me to be Premier "Billy" Hughes.

Gold was discovered in 1885, but it was in the early 90's that the big finds were made. Up to the end of 1919 33 million ounces of gold had been recovered, worth £140 millions. Kalgoorlie was incorporated in 1895, Boulder in 1897.

We were now driven to the station where we entrained for Perth, 376 miles away. While in the train a telegram was handed to me from J.J. Simons, Perth, welcoming me to their "Great big West". We left at 5.15 on the 3ft. 6in. gauge



railway. There was a shower of rain about 6 o'clock and the evening was cool.

At 7.20 a.m. (Wed., Aug. 16) we arrived at Northam, 65 miles from Perth and stayed ten minutes. We were told that this was one of the finest farming communities in Western Australia.

One of the features of this State is the famous "grass tree". Grass in place of limbs and leaves growing at the top of the trunk! Many specimens were seen on the way.

The view of Perth as we approached it was very beautiful. It is situated on the picturesque Swan River which at the city expands into Perth Water. At this time the entire population of the big western State was 335,000, half of which was in Perth and its pleasant suburbs. The majestic black swan was first seen near the mouth of this river and hence its name. The coat of arms of Western Australia bears on it a black swan with the legend "Cygnis insignis".

On reaching the station we were heartily greeted by J.J. Simons, M.L.A. (a friend of my astronomical friend H. Westoby, of Guelph, Ont.) He introduced us to Mrs. (Prof.) Ross and some others; and then he drove my party to the Explanade Hotel overlooking the river, where we secured rooms for our four-day stay.

Later in the morning Simons called with two "Young Australia League" boys and took us up to Parliament House for a cup of tea and then for a drive through King's Park and along the shore of the river. We got back to the Town Hall at 12.10 and found



the reception already begun. The acting mayor was speaking. They found a seat for me in the guests' circle. The University Chancellor, Dr. Saw, Archbishop Riley and Prof. A.D. Ross all spoke. Then Dr. Campbell replied, then J. Hargreaves (England) and then I said a few words.

After that we went over to Palace Court to a luncheon tendered by the Chancellor. I had the honour of accompanying Mrs. Riley. Chancellor Saw, Archbishop Riley and Dr. Anderson spoke and Dr. Campbell replied very effectively. It was a pleasing function.

Next morning (Thurs., Aug., 17) Jean and Bessie were taken for a drive by two Y.A. Leaguers to the shore of the dreamed-of Indian Ocean where they spent some time "gathering up the shells from the sea-shore."

At 1.15 p.m. we were at the imposing Parliament House for a wonderful luncheon given by the Premier and Government of Western Australia. Sir James Mitchell was in the chair. Dr. Campbell was on one side and I on the other. Next to me was W.J. George, Minister of Public Works. The members of the Assembly and of the Council were out in full force, including Mrs. Edith D. Cowan (the only lady member), Lady Mitchell, and the ladies of the eclipse party. I was told that this was the first occasion on which ladies were invited to a luncheon of this nature. The tables were decorated with a profusion of flowers and looked simply charming. The meal itself was excellent and was served well. Lots of liquid refreshment, too, but I took ginger ale. Apples and other fruit from the State of Western Australia were in abundance and I ate as fine an orange as I



ever tasted.

The Premier toasted the King, the President of the U.S., and the Eclipse Party. Dr. Campbell replied, and tried to show the value of education and of science generally, even of an ideal science like astronomy.

After the luncheon we went to the rear of the building where were two photographers who made a number of exposures on various groups. Several were made on my camera. Prints from these negatives constitute a fine record of a historic occasion. It was the finest luncheon we had on our entire trip.

In the evening the Royal Society tendered a reception at the Museum. The president of the Society was Mr. de Clark, and we met there A. Gibb Maitland, Government Geologist, A.R. Wright and many others. The Chairman asked Dr. Campbell, Dr. Adams, Dr. Moore, Dr. Young and myself to give some account of our labours at home.

In my address I spoke first on the University of Toronto. I outlined its constitution and intimated that \$75,000 was specially allotted yearly for research, and that a slice of it had allowed the construction of the apparatus for observing this eclipse. Then I explained the organization of our R.A.S.C. and how we secured our funds. The audience was greatly pleased with the whole programme.

Next day (Fri. Aug. 18) at noon a reception was given to the naval contingent in the Town Hall. Acting Mayor Franklin was in the chair, and Councillor Pyman who had been assiduous in his attention to the navy men also spoke. Commander Quick



replied in a humorous vein. He described the difficulty he had in locating Wallal and said that the men of the navy were handy men and would do their work well.

After the reception we went over to the Savoy Hotel for luncheon. Again Com'r Quick made a witty speech; and once more he assured us that his men would take us to our destination, would make life comfortable while there, and would bring us back in safety-because that was their orders!

In the afternoon Mr. V. J. Matthews (Head of Stott's Business College in Perth) took my family for a drive in his Dodge car up to <sup>U</sup>Mandaring Weir (or Dam), 25 miles from Perth. Here is the great reservoir of the <sup>L</sup>Goddfields Water scheme. It impounds water from the Helena River and its capacity is 4600 million gallons. From it the water is pumped through 350 miles of 30-inch steel pipe. The total lift is 1210 feet. The time taken by the water to reach Kalgoorlie, under conditions existing then, was four weeks.

In the evening was a reception at the Karrakatta Club rooms by Professor and Mrs. Ross. We enjoyed a pleasing programme of song and met many fine people.

In the intervals between receptions and luncheons, Dr. Young and I looked after considerable business connected with our expedition. We had some wood-work made for us at the University; we purchased lumber and cement, to be shipped to Wallal, for constructing <sup>6</sup>piers for our instruments at the eclipse site; we laid in photographic plates and materials for developing them.



On Saturday morning I engaged a shipping firm to make sure that all our boxes and other goods were on the ship, and in the afternoon I spent most of the time writing articles for newspapers in Victoria (B.C.), Melbourne and Toronto.

At 6 p.m. we called at the Palace Hotel for Mr. and Mrs. Adams and then we all went to Prof. Ross's for dinner. Of course it was a very pleasant occasion. We got home at 9.45 and I worked until 11.45 at my writing.

Sunday morning (Aug.20) was fine and bright. I read over my articles and sealed them for posting. We had breakfast, I paid my account and we closed up our bags. At 9.30 Dr. Gray, one of our valued new friends, called in his "Hup" and took the three of my family down the lovely 12-mile drive along the winding Swan River to Fremantle, the ocean port of Perth. We came alongside the Charon about 10.15 and put our luggage aboard.

The dock was crowded with people to see us depart. Our expedition had aroused much interest, and indeed there were a number of other passengers who aroused our curiosity. The Fife and Drum Band of the Royal Australian Naval Brigade was on the dock playing popular airs.

Those on the dock threw to their friends on the ship rolls of paper ribbon --red, yellow, blue--keeping one end in their hands. Thus the ship was bound to shore by many bright-coloured ribbons.

At 11.20 the ship's cables were cast off, the vessel moved slowly out from the dock, the slender ribbons lengthened, being payed out so that friends on ship and on shore should be united



as long as possible. At last they broke and we were out on the Indian Ocean, bound northward! The band played "Should auld acquaintance be forgot?"

In the eclipse party there were 4 from California, 4 from Canada, 2 from N.Z., 2 from England, 7 from Perth, 9 navy men with Commander Quick, 2 "movie" men - 30 in all.

On the deck of the ship was much freight scattered about, including an enormous wagon for a port up the coast.

The Charon was a ship of the Ocean Steam Ship Co. Ltd., more familiarly known as the Blue Funnel Line. Its length was 306 ft., width  $42\frac{1}{2}$  ft. and <sup>ton</sup>tonnage 2682. The ship's speed was 11 knots, and it was very steady. Its route was between Fremantle and Singapore, a distance of 4743 miles.

Charon was the old man of the underworld who ferried the souls of the departed across the river Styx which separates this world from the next. Those he took over he never brought back! We should never trust Charon!

As the ship was just moving out a country fellow on dock called to one of the naval men: "What are you going up for? You don't know anything about this solar plexus!"

At luncheon we sat at the Captain's table and at the first sitting. The ship was overcrowded. Some of the cabins were intended for two but had been altered to serve for four and the added berths were as hard as boards. Also some persons slept in the smoking room, and one woman (Mrs. Lane) told Bessie she was going to sleep on deck.



### Geraldton and Carnarvon

We reached Geraldton (252 miles) about 8 a.m. This was a substantial town of 4000 population, connected by rail with Perth and with the productive country round it. The jetty was more than a quarter-mile long, with a railway track upon it. The latitude of Geraldton is about  $29^{\circ}$  south. There was a lovely white sandy beach and a powerful wireless station.

While walking on the street I was accosted by a man who asked if I was Dr. Chant of Toronto. He also wished to meet Dr. Young. He said his name was John Wayland of the Geraldton "Express" and that he was a native of Cork, Ireland. He had a nephew, James Fryday, employed in a big store in Toronto. He took me to see the Government buildings (Customs House, etc.) and introduced me to various people, including some of the town's firemen, one of whom had three cockatoos, --two white with pink trimmings and one green. The former were very tame, liked to be petted and would dance about and speak. Indeed we found that along the west coast a favourite way to spend one's leisure was to train these cockatoos.

Wayland said he had a fine cockatoo at home, and I said I would take Young and Bessie to see it. In the early afternoon we found our way to his rooms --he was a bachelor. He showed us photographs of the Frydays, an old book printed in 1640 and his wonderful cockatoo. It would speak his name "Mr. Wyland", dance, lie on its back and catch empty (kodak) spools, ring a bell, scratch the cat and perform other amusing feats.



Wayland was boastful of his Australian home. In this neighbourhood, he said, the finest wheat in the world was grown; also, the death-rate there was the lowest in the State, and several people in Geraldton were over 100 years old. He also told a funny story which I must repeat. It was of some fellows in County Clare who went out to ambush and shoot an obnoxious man who was expected to pass along at 9 p.m. He had not appeared at 9.20 and one of them remarked: "I hope he has not had any accident".

Seeing a shop with a sign "Canadian Hair-dressing Parlor", we stepped inside. The proprietor's name was Monery and he came from London, Ontario. He had been in the First War and he had been here 18 months. He was glad to see us. Never far from home!

The ship was due to sail at 3 o'clock but did not get away until 4.40

In the evening there was a fine display of the Zodiacal Light; the illumination reached up <sup>along the Ecliptic</sup> to the bright planets, Venus, Jupiter and Saturn.

We steamed steadily along the shore and at about 4 p.m. next day (Aug. 22) we passed Cape Inscription, which is on Dirk Hartog Island and is the most westerly point of Australia. Having this island on our right and Dorre and Bernier Islands on our left, we entered Shark's Bay.

Several whales were seen during the day, one quite close to the ship. In one case a killer was attacking a whale.

At about 5 p.m. there was visible a beautiful example of the antapex of "the sun drawing water". Stretching above about ninety degrees of the eastern horizon, streamers were to be seen,



apparently diverging from a point directly opposite the sun, i.e., as far below the eastern horizon as the sun was above the western horizon. I noted that some of the streamers at the eastern horizon were dark, being the shadows of the clouds. A ship's deck is a very suitable place from which to observe the phenomena of the sky.

It was 8 p.m. and quite dark when we got up to the jetty at Carnarvon (592 miles) which is on the familiar Shark's Bay, at the mouth of the Gascoyne River.

The crew at once began to unload the cargo. Among it was the huge wagon on the deck. Its wheels were 6 feet in diameter and their rims were 6 inches wide. It was to be drawn by 16 to 20 camels and it could carry 9 tons. The camels, I was told, made <sup>10</sup>10 miles a day and can go two days without water, but they perform better if watered twice a day.

The mayor, A.C. Angelo, his wife and Mrs. Iles, town clerk, came to the ship to see the crowd, and some of our party had a long talk with them. The mayor owned two camel teams. No wheat was grown about here. The land was used mostly for grazing, one sheep to 10 ac<sup>res</sup> and some farms have 500,000 acres. On the dock there 250 bales of wool, 350 lb. each, to be loaded for Singapore; 7 bales had been taken on at Geraldton. Among other things unloaded was an 'aermotor' windmill made in Chicago.

A steam tram took a large number of the passengers to the town, three miles away. I did not get to bed until after 11 o'clock.

Members of the crew worked almost all night getting cargo



out and putting more in. On taking it out it was loaded on small freight cars on the jetty. Several cows and calves were unloaded from the ship. This was done by means of a big box with ropes attached to it by which the ship's steam derrick could lift it.

Several of the crew did some fishing during the evening, catching chiefly schnapper and skipjack; but on the last north-bound trip they caught a shark.

Next morning Bessie and I walked along the jetty, which was a mile long, and jumped off on the sand to gather shells. We found many fine ones and started back for the ship. Soon the first whistle blew, and we hastened our pace. The tide was rising and at one place we took off shoes and stockings in order to wade through shallow water and save a long detour, and we finished "on the <sup>n</sup>fun". But we arrived half an hour before the ship started forward!

I was sorry we did not arrive in this port in daylight as there were many interesting things to photograph and I did not make a single exposure.

There were on the ship two men from Christmas Island, W.S. Anderson and W.H. Rushome. They were returning from a holiday visit to Perth. The former was a chemist, the latter a carpenter, and both were employed by a company recovering phosphate of lime from the island. They told me of Spencer Jones and P.J. Melotte, of the Greenwich Observatory, who had come out to observe the ~~e~~clipse on Christmas Island, which is in lat.  $10^{\circ} 25' S.$ , long.  $105^{\circ} 42^{\circ} E.$ , about 190 miles S. of Java. It is 12 miles long, 9 miles wide and had a population of about one thousand, practically



all employees of the Phosphate company. Jones was able to get off in the lee of the island but Melotte stayed on the ship for about ten days to look after the chronometers. But they did not suffer any hardships. (Jones and Melotte were greatly disappointed when, on the day of the eclipse, the sky was cloudy and no observations could be made. Jones was appointed Astronomer Royal in 1933).

On this evening we were greatly interested in the phosphorescence in the water near the ship as she steamed along. As the water streamed past the ship numerous star-like bright spots appeared in it. Most of us had never seen it before but in our discussion of it one of the passengers bound for Christmas Island stated that <sup>it</sup> was due to small organisms known as Ascidians (order Tunicata)

#### North West Cape and Onslow

Next morning about 9 o'clock we passed N.W. Cape. At 12.45 the Onslow (924 miles) jetty was in sight and a schooner was waiting for us about a mile and half out from the shore. The water was too shallow for the Charon to go up to the jetty, and another jetty was to be built at a cost of £90,000. The man who was to build it was on our whip.

The schooner tied up alongside the Charon and we took off it 2 boxes of tortoise-shell (about 2x3x3 ft.) bound for Singapore; also 85 bales of wool from Lyndon and Maroonah stations. Then the schooner moved back to the stern hatch and took on cement and other goods. The cement was made in London, Eng. Another schooner now came up, being towed into place by a motor boat, and took on iron



rods for the new jetty. Apparently both schooners were taking on materials for the jetty.

The motor boat was now free. Upon it had come Mrs. De Pledge, whose 14-year old daughter had been a passenger in Bessie's cabin. Mother, daughter, together with 7 or 8 men, left on the motor boat for the shore: the men probably to start work on the new jetty, the women to go by motor car 65 miles south to their home. The girl had been at a school near Melbourne and had come home for a two-weeks' holiday - 2180 miles by rail, 924 by ship, 65 by motor, 3169 miles in all.

The unloading of the iron rods to the lugger continued until 9.30 p.m. when it was decided to leave the rest of them on the Charon until her down trip.

During the evening there was an exciting incident. The ground swell gradually grew stronger and the lugger rolled back and forth, her mast thrashing about and knocking fiercely against two steel ropes running from the top of the Charon's mast to the end of a spar. As bad luck would have it, the top of the lugger's mast got between the two steel ropes and all efforts to separate the two ships were unsuccessful. Finally one of the Malay crew of our ship climbed the mast of the lugger, which swung him violently from side to side; but, watching his opportunity he quickly pushed the offending rope over the top of the lugger's mast and thus separated them. It was a thrilling performance, involving great personal danger, and a crowd of passengers who were watching the operation vigorously applauded the man when he accomplished the job.



Fifteen minutes later we were on our way and the ship's motion was hardly perceptible.

Point Sampson and Port Hedland

In the morning (Fr. Aug. 25) the weather was fine and pleasant, and the ship was steady. We saw two whales at about 12.30; also, what I took to be a big turtle some 200 yards away.

At 2 o'clock the ship tied up at the Point Sampson jetty, which was a high and moderately long structure. The tide was low and the water was still falling rapidly. On our arrival we stepped from the top deck of the ship onto the top of the jetty. We went for a long walk upon the shore and found many fine shells. Upon returning at 5.30 p.m. we walked from the top of the jetty onto the shelter over the upper deck where one goes to get on the bridge. The water was so low that the cargo could not then be discharged from the ship to the freight cars on the railway on the jetty.

It is a great mystery to me that the tides should be so high and so low on an open shore.

In about an hour, however, the water began to rise and the handling of cargo soon began again. A large number of boxes of mother of pearl were taken on and also 360 bales of wool were put in the hold of the ship.

Roe<sup>e</sup>bourne, a well known place, is 14 miles from this port and there was a 2-ft. steam tram joining the two settlements. The little engine, I noticed, was made in Germany. However it did not make a trip while we were in port and no one visited Roebourne.



Near Point Sampson are two magnetic shoals. The course of our ship was changed so as to pass almost over one of them. At one moment the compass needle pointed  $15^{\circ}$  W. of S., but in 10 seconds it swung to  $60^{\circ}$  E. of S., that is, through an angle of 75 degrees. If one passes directly over the shoal, I was informed, the needle may turn completely round, the total force directing the needle into any particular direction being very small.

By 11 p.m. the tide had risen sufficiently for the ship to leave the dock and continue on her route.

Saturday, Aug. 26, was a fine day, with a pleasant breeze. At about 10 a.m. we approached Port Hedland, but as the water was too low we anchored for an hour and then slowly steamed up to the jetty.

Port Hedland (1249 miles, lat.  $20^{\circ} 20' S.$ ) was a town of about 400 people and an important centre of trade. A railway 120 miles long connected it to Marble Bar where gold along with lead and asbestos had been mined; there was only one train a week.

We got off and walked up town, with my camera. An interesting photograph I took was of a high-up-in-the-air sleeping place. It was like a cabin on the roof of a three-story house. This was a racing day and the stores were closed. Capt. Rose, Mr. Kelly and others took a train to the race-course which was three miles away. We called at a store which we noticed was open at 12.30, and we found that Mrs. Moseley, the proprietor's wife, could not go to the races. She said that the winter had been very cold and



dry. The soil was sandy and there had been very little rain. We saw a pepper tree or two, but there was not much vegetation. We noted some of the <sup>a</sup>coarse spinifex grass and also a bird-flower shrub.

One of the citizens asked us if we were going to Wallal. He said it was a little hell.

The tide here, also, is very high. The change in level of the water between low and high tide is from 22 to 26 feet. At 6 o'clock the ship was far down and much shore about it was exposed. Later it got high enough for the ship's derrick to begin operating and the loading went on after midnight.

Next morning (Sun, Aug. 27) the loading of wool was finished - 907 bales in all - and at 11 o'clock a "mob" of 670 sheep, sheared merinos with curled up horns, were led and driven onto the ship, destined for Singapore (4742 miles) for mutton. Some of them were put underneath in the hold of the ship, but many were roped off on the open deck. These sheep came from a station 50 miles away, driven ten miles per day. Many camels were used about here, the citizens told me.

We gave the Purser much mail matter to post. It would be picked up by airplane on Monday morning, carried to Geraldton and given to the railway and then taken across the continent to Sydney to catch the next ship sailing for America. Actually the eclipse was over before the letters reached our friends at home.

Capt. Rose told me that at Derby (1827 miles) the ship would take on 280 head of cattle for Batavia, Java, (4143 miles)

As we would soon reach the part at which we would



disembark, in the afternoon we packed the dunnage bag and the trunk, respectively, with things to take with us and to leave behind at Broome.

The sunset was very red and fiery, with gorgeous streamers.

During the night a smart breeze from the N.E. sprang up and a big wave slopped over into Young's cabin through the door, which was slightly open, and wet his bed covers. In the morning (Mon., Aug. 28) there was quite a sea and yet the ship was remarkably steady.

The wind was in the N.E. and we were steaming about N.E. by N., and we reached Broome (1546 miles) at 2 p.m. on a high tide.

Broome is in latitude  $18^{\circ}\text{S.}$ , which is about 175 sea-miles beyond Wallal, <sup>which is</sup> on the Ninety-mile Beach, <sup>and was</sup> our ultimate destination. We were to transfer to a schooner at Broome and be taken back to <sup>Wallal</sup> that place on the Beach.

When we were perhaps seven miles away from Broome the white and red shores were very prominent. Through the effect of mirage they looked much higher than they really were. A steamer near the shore appeared twice as high as it did when we came close to it.

During the morning the crew of the ship uncovered the hatch and sorted out our freight down in the hold so that it could conveniently be removed; and soon after the Charon had been tied up to the dock the cargo began to come up. It was loaded on the small cars which were then pushed along the jetty to the 2-mast, 80-ton schooner Gwendoline which was on the other side of the



jetty. The supplies were lowered into the schooner by means of a hand crane.

15. Bessie, Young and I went on the little train up into the town, single fare, 1s. We were pleased to see the number of trees, including oleanders in bloom and bougainvillea vines full of flowers. We bought picture post cards which we posted to our friends at home; and I photographed a Baobab tree, which was a stranger to me.

On returning to the dock we found that the water had fallen over 20 feet, and that the Charon was resting on the bottom so that one could walk around it. The Gwendoline had heeled over so that the work of loading her had to be stopped. However by 10 o'clock p.m. the water had risen enough for loading to be started again. Our Naval men and the men attached to the jetty worked with a will. There was a great heap of apparatus and supplies, and some persons predicted that the lowering of the goods and the storing of the things in the schooner would not be finished before noon next day. But it was actually completed by 2 o'clock in the morning.

Anchored out in deep water was the steamer Governor Musgrave, a light-house tender. The tender of H.M.A.S. Geranium, <sup>which was</sup> then at Broome, at 12.30 a.m. had taken our ladies over to the Governor Musgrave, which was to take them back to Wallal. We asked the Musgrave to come and take us out into deeper water, but it did not do so. However the schooner threw off her lines and managed to get away from the jetty and anchor in somewhat deeper water.

The sight of the steamer, the schooner, the rising water and the brilliant starlight made an impressive picture.



We saw Orion coming up feet first; also Taurus facing downwards, with the Hyades sitting up like A instead of like < Canopus and the Magellanic Clouds also were very prominent.

The party on the Gwendoline went to bed at 3 o'clock. Campbell, Moore, Adams, Ross, Quick and I had berths in the cabin, hard though they were; some had stretchers on the deck; one or two went down in the hold; and the rest lay on top of the cabin.

#### On Board the Schooner

Next morning at 7 o'clock I looked out and found that we were still in the neighborhood of Broome. The Governor Musgrave had stayed near us during the night; and now she came over to us and gave us a line and began to tow us. It was said that our speed was  $7\frac{1}{2}$  knots and that the Musgrave itself could make only 9 knots. We felt that we were making satisfactory progress.

It was a fine day and beautiful sailing.

First in the morning we had tea and biscuit, and then, at about nine o'clock, breakfast. It consisted of bacon and eggs, although some had also a slice of beefsteak cut off a quarter of beef hung up near the ship's prow.

During the morning we used no sails, but about 1.30 p.m. four sails were put up to steady the ship.

On the schooner there were 36 persons, as follows:-

Lick party.-- W.W. Campbell, (Mrs. Campbell,) J.H. Moore, R.J. Trumpler, C.E. Adams, (Mrs. Adams), A.D. Ross, J.M. Hosking (8)

Canadian party - C.A. Chant (Mrs. Chant, Miss Chant), R.K. Young (4)



India party. - J. Evershed, (Mrs. Evershed), D.W. Everson from Perth (3).

English party. - J. Hargreaves, G.S.C. Maxwell (2)

Western Australia party. - Nossiter, Yeates, Matthews, Nunn, Dwyer, their cook (6).

Navy party. - Lt. Com. Quick, Rhoades, Starling, Kenny, Hutchins, Sinclair, Barker, Cushing, Kean Roberts (10).

Movie men. - Cremer, Sharp (2) . . . . (35 counting women) <sup>who however were on the steamship</sup>.

Police - Hdqrs. in Broome, in charge from Wallal to Daly - Dewar (1).

Ship's crew - Skipper Le Poigniere, a native of Madagascar, and four Malays (5).

Total 41, less 5 women on Musgrave = 36, <sup>on the schooner</sup>.

The cargo was about 67 tons by volume (1 ton = 40 cu. ft.) 35 to 40 by weight.

A long line trailed behind the schooner baited with a rag on a hook behind a spoon, and at about 1.30 p.m. a 15-lb. Kingfish was pulled in.

#### Town of Broome

Matthews had called on Mansbridge, the Resident Magistrate (Judge of the District), who gave him many facts about Broome. Its cosmopolitan population was 4000 in all, of whom 1200 were whites. At movie theatres whites sat on one side, foreigners on the other. Japs and Chinese had no dealings with each other; indeed Japs were not liked by any others.

On leaving the house the doors were left open and usually (at night) a light left burning with something for a caller to drink.



Japs were the best divers and could stay down from morning until evening, with short intermissions. They got from £200 to £600. The lugger slowly moves on and the diver runs forward along the bottom. The price of mother-of-pearl shell was £60 per ton; before the war, £250.

### End of the Journey

We kept moving southward all day. The weather was pleasant and the trip enjoyable. During the night I looked out on the deck. All was quiet. The barefooted skipper had his hand on the tiller, earnestly gazing ahead as we were steadily towed along. By 6.30 next morning it was thought we would be as far south as Wallal, and we headed in towards the coast. At last some features were detected. Quick climbed the mast of the schooner and examined the shore with field-glasses. He reported that he saw some beacons, being poles with a triangle  $\triangle$  at the top, and also some persons moving about on the land.

We went on until about 5 miles from the shore and then dropped anchor. We had with us a motor-boat and a whale-boat. The engine of the former was "fixed up" by one of the navy men and it towed the latter with Campbell, Quick, Cremer, Sharp, Dewar and Rossiter in it to shore. It required 40 minutes to get there. They all had to get out in the water and wade ashore, as the shore shelves out very gradually. The boat returned and at once preparations were made to take our goods ashore.

At first both motor-boat and whale-boat were loaded, but in that case neither one could get near the shore. There was quite a long carry to the land; and the tide was rising and continued to



do so until 4.30 p.m. By loading the cargo on the whale-boat and using the motor-boat for towing it, more rapid progress was made.

The aborigines who lived in this part of the country, having heard of our arrival, came in large numbers to the shore and they helped to carry bundles and boxes and all sorts of things to land. The surf wet everyone who passed through it. Not many persons went ashore this afternoon to stay there, as preparations for them had not been made.

Davidson, the proprietor of the Wallal Pastoral Co., whose station was 3 miles away, brought his two wagons and mule teams and loaded up the goods and carted it to the site, a mile and a half away, which W.W. Campbell and Quick had chosen for the eclipse observations. Some camp equipment was sent to the location chosen for the camp.

Meanwhile the lifting-out of the cargo from the schooner's hold and the transferring of it to the shore was continued.

During the afternoon the Governor Musgrave delivered the ladies to the Gwendoline, and after standing by awhile started down the coast.

At night the ladies occupied the cabin, some of the men had stretchers-I had one with a single blanket-and others slept on deck or down in the hold. We were all pretty cold in the morning!

At about 4.30 on the previous afternoon, (Aug. 30), when the tide was high, the schooner's mainsail was put up and the ship was moved in until perhaps  $1\frac{1}{2}$  miles from the shore and anchored in 2 fathoms of water, and then a kedge anchor was put out with which we were pulled farther in by a hand winch. When the tide went out



the schooner was left in only two feet of water and the surf rolled about us with a majestic motion and a loud sound. We had expected the water would recede from the land until beyond the ship, leaving it high and dry, so that it could be unloaded directly onto a wagon, but the skipper was afraid his ship might be injured and did not go close enough to the shore.

At 3.30 a.m. on Thursday, Aug. 31, the men got up and took ashore in the whale-boat the lumber and other remaining cargo. Young had stayed ashore the previous day. Bessie and her mother left at 9 o'clock a.m., being carried over the water, and I left with others at about 10 o'clock. We went as far as we could in the whale-boat and then took off shoes and socks and waded ashore.

We were met by a number of men and women aborigines who came in the water and carried off the parcels. One "gin" took my suitcase, carrying it half the time on her head and the rest at her side with her arm around it - and it was uncomfortably heavy, too. They were certainly a tough-looking party, though not so bad as those haunting the Transcontinental Railway.

*End of Part 4 (Australia)*  
Go Home Aug. 19, 1951



### 5. The Eclipse Camp and the Return Home

The site for the eclipse camp chosen by Dr. Campbell and Com'r Quick was a short distance north of the Post Office and the Government Well, which were near together, and about a mile and a half from the ocean.

This well was sunk in 1875 by Alexander Forrest, a distinguished Australian explorer who at that time was endeavouring to establish a route for driving cattle and sheep to a port for shipment to a market. The well is only 16 feet deep and it had to be blasted from the limestone rock. Without it the camp could hardly have been located here.

#### Spinifex, Wattle-trees, Sand

The land was quite level and was sparsely covered with clumps of spinifex and scraggy wattle trees. Campbell had blocked out the portion he desired for the Lick party and we picked out what we wished, quite near to it. At once we started to clear the land and to mark out the place for our instruments.

The ground was very dry and covered with light sand, and when tramped over by man or beast this was crushed into the finest dust. When one walked over it, with every step a cloud of fine particles rose, slowly spread out and settled on everything.

#### The two Desert Wagons

By this time the two wagons with wide tire-rims from the Wallal Postoral Co. were transporting the freight and supplies to camp site. They were quite picturesque. One wagon was drawn



$8 \times 3 + 2$

by 26 donkeys, i.e.,  $8 \times 3 + 2$ , the 2 donkeys being next the wagon; the other by 14, i.e.,  $4 \times 3 + 2$ , and both could pull big loads through the sand. There were some heavy parcels to move. I had 2 bbls. of cement, ordered at Perth, each of 350 lbs., and one of my packing cases weight<sup>ed</sup> 290 lbs. The last of our supplies were delivered to the camp on September 1, the day after our arrival at the beach.

### Many Tents, varying Temperature

The camp was soon organized. There were 12 tents for the eclipse party to sleep in, 2 dining tents, a storage and a cooking tent, together with numerous tents erected at the astronomers' outfits. We pitched the tent which Government Geologist Maitland had kindly loaned us and in it spread out some of our tools and instruments. It was a great convenience.

Our camp was in lat.  $19^{\circ} 45'$  south, i.e.,  $4^{\circ}$  degrees within the Tropic of Capricorn. In early September the sun is (say)  $7^{\circ}$  N of the equator, so that at noon the sun was about  $27^{\circ}$  from our zenith. During the day it was very warm; generally there was not a cloud in the sky. In the evening the temperature dropped quickly and in early morning it was decidedly cold. Day after day it was the same; cloudless sky, boiling hot at mid-day and cool in the evening; dust and dirt everywhere!

### The Einstein Camera

Our chief instrument was the Einstein camera. This was really a telescope in which the 'tube' had a square section and was constructed of strap-iron open lattice work. It was 11 feet



long. The lens was 6 inches in diameter and mounted at one end of the tube, and the camera back for holding the 14 x 17-inch plateholders was at the other. The tube was rendered light-tight by covering it with black cloth. It was held at its middle within a rectangular frame or yoke which itself was supported at each end upon a wooden framework or standard so that it could be rotated about an axis. The whole mounting was patterned after that of the 100-inch telescope at Mount Wilson. The standard at each end rested on three low cement piers. One standard had been constructed higher than the other so that the axis of rotation of the telescope should be parallel to the axis of the earth. As we were in the southern hemisphere the south standard was the taller.

These standards had been constructed in Toronto, of the proper height for the latitude we expected to be in, and the apparatus set up. After testing its behaviour it was taken apart and put in suitable packing cases for shipment abroad. We now opened up the case containing the standards and screwed them together.

The moulds for the cement piers, in knocked-down condition, were in another case. We got them out and screwed them together and carefully placed them in the places prepared for them, three at each end. Each had a horizontal section of about a square foot and was about a foot and a half high. We got this all ready by Saturday evening, September 2.

#### Our first Sunday at Wallal

The next day was hot and dusty as usual, but we were



engaged on important business and Young and Bessie and I got up early and mixed cement and poured it into the moulds for the piers. The job was finished before breakfast.

Young had already done considerable work on the polarization apparatus, and the Lick party were putting in their piers at the same time.

This morning flags were found flying over our tents, put there by Warrant Officer Rhoades. There was a U.S. flag for the Lick party, a blue ensign with Canadian shield for us, a blue ensign for New Zealand and a Navy ensign over Commander Quick's tent. At the breaking up of the camp I was permitted to carry home our flag as a souvenir.

The day was much used for writing in the big dining tent. In the morning I wrote an article for the Melbourne Herald and in the afternoon one for the Toronto Star. Many others were similarly engaged, and it was observed that the writing paper seemed to dry up in the hot and dry atmosphere.

During the afternoon the aborigines did some things to interest and amuse us. "Blackfellow" Horace tried to make fire by rubbing sticks together, but there was too much wind. He got smoke but no open fire. In a more protected place grey-haired Moses was successful. I got him to saw off the end of the rough hardwood stick about two inches in diameter against which he did the rubbing, and this and the other stick he used in the operation he gave to me. Several aborigines showed us how to throw boomerangs. *I learned that there were several types of boomerangs:* some are to be thrown at an animal when hunting or at a person when fighting, and some just for play. The latter are much lighter and



more curved than the others. I brought home four samples.

All four of my party walked down to the beach in the afternoon, and Young and Bessie and I went in the water. The tide was coming in but the water was pretty shallow, and we had to walk out a considerable distance to actually swim.

#### Setting up the Einstein Camera

We spent several days erecting the Einstein apparatus. First we trued up the bearings on the polar axis, and with the help of the navy men we set it (the wooden yoke) in place. We had difficulty in getting its inclination right, i.e., in adjusting it for that latitude. Then we got out the massive astronomical driving clock from its packing case and set on its shelf on the lower standard.

Next we unpacked the heavy camera, put it together and then, with the help of our friends, put it in the polar axis. Then we covered it with black cloth and balanced it. This gave considerable trouble; and it all took much time.

On Tuesday just at sunrise I noted two narrow horizontal strips of cloud in the east which soon disappeared, but the day was cool, for a change. On Wednesday night there was a very heavy dew. On Thursday morning water was dripping from the trees and the spinifex had a greenish tinge. We were also surprised to find the driving clock quite wet although it had been carefully covered up. On two other days during our stay in the camp there was a similar heavy dew. In each case Mr. Owen said it was equal to '3 points' of precipitation, i.e., .03 inch rain., and he said it was almost unprecedented at this time of the year.



### A Triple Birthday -- September 7

On Thursday, Sept. 7, there was a remarkable coincidence. It was discovered that in the Lick-Canadian party, comprising some twelve people, three of them were born on that date. They were Mrs. Chant, Dr. J.H. Moore and Dr. A.D. Ross. At breakfast there were general congratulations, and the evening meal was a splendid dinner in honour of the occasion. Com'r Quick made a little speech before dinner; and after it he started the toasts. Jean acknowledged the kind attention, Moore returned thanks, and Ross did the same and also spun a few yarns. This led to reminiscences by Mrs. Campbell and Dr. Campbell; and W.O. Rhoades sang a song. A very pleasant time was spent.

### Aeroplane Visit

On Friday morning the mail-carrying aeroplane called at the camp. First it flew about for the people to get a good view of it and to take any photographs. Then it landed for a closer examination. It was a bi-plane and was owned by the big shipping firm of Dalgetty. Its weekly visits kept us in touch with the outer world. The pilot offered to take anyone up for a ride, the fare being £2/2 for half an hour. Ross and Trumpler accepted and were interested in the camp and the surrounding <sup>country</sup> as seen from the air.

On this same day we made the piers for the polarizing camera, not so large or so high in this case. All the succeeding days we were adjusting and testing the instruments. It seemed there was always something going wrong! The big driving clock of the Einstein camera gave trouble. We balanced and adjusted and oiled the whole



instrument, but it would run only a short time. Young took the clock to pieces and cleaned it, and finally we got it to run satisfactorily.

### Sunday again

On Sunday, Sept. 10, the temperature rose to  $96^{\circ}$  in the shade, yet the heat was not oppressive. As a week before, there was much writing in the dining tent. I wrote two newspaper articles as on the previous Sunday and arranged for them to be picked up by the aeroplane on its trip south next morning.

After this my party (4); together with Everson<sup>who was</sup> of Perth but assisting Dr. & Mrs. Evershed of Madras, India; and Maxwell of the English party; set out for the beach carrying our lunch. The tide was at full, there was a good surf and we had a fine swim. After lunch we walked the beach to the south and found many fine shells.

In the evening we checked the azimuth of the Einstein camera and moved the north standard slightly. It was improved but not yet perfect.

### Erecting the Observatory

Our next job was to erect our observatory, or shelter, for the Einstein camera. I had purchased 2 x 4 scantling and other lumber at Perth and it had all been delivered to our camp except one jarrah scantling, and I had brought from Toronto sufficient cotton duck for the walls and roof of the shelter. Kenny and Hutchins helped us to set up the scantling approximately in a circle, to fasten them together by nailing strips of lumber to them, and to guy the whole frame to the surrounding trees. Then the cloth



was tacked to this framework to form the wall of the shelter. For a roof, cloth was spread on wooden strips laid across the top of the shelter.

This was a protection from the wind and the hot sun. But within our circular observatory the dust under foot was very bad. So we got two men to carry coarse red sand and spread it on our floor. This was an improvement. To help still further we got Moses and Tommy to bring water from the well and spread it on the sand. This kept down the dust very satisfactorily, but of course the water had to be applied each day. Other persons in the camp heard of our experiment and treated the ground about their instruments in the same way.

We continued the adjustment of our big instrument, especially for azimuth, i.e., to get the polar axis in the n-s <sup>vertical</sup> plane.

#### Hottest Day and Aboriginal Dancing

Wednesday, Sept. 13, was the hottest day I ever ~~ever~~ experienced. In our 'observatory' the temperature rose to  $105^{\circ}$ , in our improvised dark room it was  $110^{\circ}$ , a thermometer hung out in the sun showed  $133^{\circ}$ . But in the approved thermometer screen the maximum recorded was 99.3.

Yet in the evening the natives for our amusement put on a big exhibition of dancing round a big fire. The men wore only slight loin-cloths. The old chief and several women stood or sat off to one side and 'sang' or hummed a monotonous tune, beating time with a boomerang against a shield, while the men danced about the fire. Sometimes the women joined in. Then, for a change, the naval party, led by Com'r Quick, danced about the fire too.



I noticed that Bridget, Eliza, Sarah, George and the rest of the aborigines, although they had laboured hard all day, <sup>scarcely</sup> rarely carrying pails of water on their head, danced vigourously, apparently enjoying the party.

### Many Emergencies

There was always something happening in the camp. First the wireless set by which the Lick observers obtained the time, which was of fundamental importance, went wrong, and of course no replacements were obtainable at the camp. Adams was in charge of this branch of the Lick outfit. What could be done? We learned that Matthews of the West<sup>ern</sup> Australia group was a clever amateur wireless man, and with the permission of Nossiter, the head of the W.A. party, he brought their set at certain times to our camp, and by listening at various hours of the night and the day he and Dr. Campbell were able to pick up signals sent out from national observatories in Europe and America, and thus to regulate the chronometer which had been brought from America. Then our two flashlights failed, which caused great inconvenience when working in the dark.

Both night and day we were continually making alterations and testing our apparatus, until we felt some confidence in our handling of the instruments.

### Visitors and Messages

On Friday Sept. 14, a young man reached our camp who had walked from Broome and was on his way to Fremantle. He had taken 13 days to get this far, about 200 miles by the 'stock' route. He had been on a U.S. schooner and was paid off at Broome. Obtaining



no work there, he started on his long walk. He expected to go to Port Hedland, another 150 miles and if possible get passage from there to his destination.

On Saturday evening, Sept. 16, a 'sky-pilot' named Simpson came in on his motor-cycle. His headquarters were in Broome. He had spent some years in Vancouver and he saw the 1918 eclipse at Baker City, Oregon. There was some talk of a religious service on the morrow, but nothing came of it.

A telegram came this day from Premier W.M. Hughes addressed to W.W. Campbell: "Best wishes for good weather and successful observations".

A wireless telegram addressed to me from Captain Crawford of the Makura which was to sail from Sydney on Sept. 21: "Best of luck, Crawford".

#### Clouds in the Sky, Rehearsing the Programme

Monday Sept. 18 was warm in the morning and breezy in the afternoon with some clouds in the sky. When Bessie and I went to the telegraph office at 4.30 to send a message to Broome engaging rooms for after the eclipse, we saw a small cumulus cloud in the east—a little cloud like a man's hand?—but a breeze from the ocean made one think that rain would soon come. But it didn't, although a heavy dew did. Mr. Owen said these fogs and dews were almost unprecedented at this time of the year.

Dr. Campbell had chosen Kean, of the Naval group, to announce the minutes and seconds at the time of the eclipse, and this afternoon we rehearsed the programme three times—doing it



satisfactorily. At the same time Young and I practised with the Einstein camera, <sup>while</sup> and Starling and Sinclair of the Naval party and Bessie handled the polarigraph.

Tuesday was a fine day again, with the barometer rising. In the morning the Lick party and ourselves drilled with all the apparatus and the "movie" men took films of the party in action. In the afternoon we had practice on the polarigraph and in the evening on the Einstein camera. We finally decided to make four exposures on the eclipsed sun: 8-60-60-4 seconds.

There was another big dance by the aborigines <sup>this</sup> ~~to~~-night. 10-year old Tommy in his war paint, put on by his proud mother, leading the performance. I noted that their 'song' for all the interpretive dances was the same, like a tune in march time played on the bagpipes.

To-day I sent a 410 <sup>( )</sup>-word telegraphic despatch to the Melbourne Herald describing the camp. The editor replied expressing cordial thanks.

#### Final Preparations

Every day and every night we continued our practice with the apparatus, and on Wednesday night we loaded all our plate-holders, 28 plates in all. Campbell had about 50. It was long after midnight when some members went to rest.

On Wednesday afternoon we spread out the sheats <sup>e</sup> on which Jean was to observe the "shadow bands". By means of the shadow of an upright stick we hoped to determine the time, and also the direction in which the 'bands' moved.

#### Thursday, Sept. 21, -- The Day

The sky was beautiful and clear, with no wind at all,



although we had noted a land breeze the night before from 10 o'clock until at least 1 o'clock.

We made final inspection of our apparatus, and then waited.

At 12.03 was the first contact. In a few seconds one could see the little piece bitten out of the lower left portion of the sun by the moon. The little piece grew larger, and as it did so the sky took on an indigo hue, and there seemed a 'thickness' in the atmosphere as if from an impending storm.

The predicted times of the other contacts were as follows:

|                |         |                |                 |                 |                      |
|----------------|---------|----------------|-----------------|-----------------|----------------------|
| 2nd contact    | - - - - | 1 <sup>h</sup> | 27 <sup>m</sup> | 22 <sup>s</sup> | W.A.T.               |
| 3rd "          | - - - - | 1              | 32              | 41              | "                    |
| Subtract these | - - - - | 5              | 19              |                 | duration of totality |
| 4th contact    | - - - - | 2              | 49              | 54              | W.A.T.               |

Second contact, the beginning of the total phase had been predicted for 1<sup>h</sup> 27<sup>m</sup> 32<sup>s</sup> and at 10 minutes before this time Kean, standing on a wooden box, began counting in a loud voice,

10 minutes to go --- 6 min. --- 2 min. --- 30 sec., *and so on;* and when Dr. Campbell actually saw the sun disappear behind the moon he shouted "Go!" <sup>*Immediately*</sup> Kean, having the chronometer before him, started counting seconds, 1, 2, 3, --- 57, 58, 59, 1 min., and kept it up until the entire total phase was over; and during this time the astronomers made their operations according to their schedules.

The beginning of totality was 7<sup>s</sup> after the time predicted by Tucker and 23<sup>s</sup> before the time given above. The duration of totality was 4<sup>s</sup> shorter than the 5<sup>m</sup> 19<sup>s</sup> deduced from the above table.



### Operations under High Tension

We had some trouble with our exposures. In order to give slow motion to our camera we had arranged a <sup>card</sup> around the slow-motion rod connected with the driving clock. By pulling one end of the <sup>card</sup> or the other, the observer could give a small motion backward or forward to the camera. A piece of fish-line <sup>the cord</sup> was used for this purpose and we practised with it in our rehearsals. Just at the beginning of totality a too-violent pull was given to the cord and it broke!

We were horrified! Were we going to lose all our effort? Young had never failed in any emergency. With great skill he repaired the cord and replaced it round the rod, but we had lost many precious seconds. Hastily deciding on exposures, we secured one plate at 9<sup>s</sup> and two at 45<sup>s</sup> which gave good negatives for our purpose.

Bessie with her two helpers secured her 20+1 plates with the polarigraph, and Jean made her observations of the shadow-bands and also exposed two plates.

Sept. 30, 1951

### Taking down and Packing up

Now began another phase of our labours. On Friday we slaved all day taking down and packing up our apparatus, and we had excellent assistance in handling the heavy parts. By nightfall most of the blue-painted boxes were filled and half of them were finally screwed down. By noon on Saturday we had finished packing, the mule teams had taken it to the beach and much of



it was on the schooner.

In the afternoon I went up to the presentable corrugated<sup>5-in</sup> post office to write an article for a home paper; and in the evening as a grand finale to our fine dining service, Com'r Quick tendered an eight-course dinner to the scientists.

But next day (Sunday) there was a change. Upon rising we were surprised to see the sky covered with clouds and it hardly cleared all day. Also, a strong southwest wind blew the dust about in a fearful fashion.

After lunch we went to the beach, and as it was expected that we would spend the night there, the cook's galley was dismantled, as well as some other things, but fortunately not our tents, as we had to come back and sleep in them. We had a 'scrap' dinner in a poor light and went to bed with excelsior under the end of the mattress instead of a pillow on top.

#### Power of the Sea

On Monday our tents were pulled down and we went to the beach in the morning. I rode on a donkey wagon, holding our plates in my hands and having our baggage at my feet.

The wind blew from the west all day and the surf was high. The captain of the Gwendoline sent the whale<sup>^</sup>boat ashore to get cargo. Some was loaded and taken back to the ship; but on the second trip to shore a great wave lifted up the boat and brought it down so hard that the bottom was stove in. It was pulled out on the shore and Kenny repaired it in the afternoon, but no more cargo was transferred that day. There was disappointment and lots of grumbling. A sandstorm continued to blow along the beach. There was a scrap lunch and a



similar dinner. Conditions were not comfortable.

The Geranium came in sight and the women were taken out to it in the afternoon. That night I slept out among packing cases which were spread along the shore, and as a reward for wakeful hours I had beautiful views of the moon, Venus, Jupiter and Mercury

#### Completing the Loading

In the morning there was an east wind which helped to keep down the surf, and the tide was far out. Before day-light about forty people dragged the whaleboat out 200 yards beyond the high-water line so that the tide <sup>w</sup>should catch it when it should rise. It got up to it about 10.30 a.m., and the boat was found to be watertight! It was loaded at once and rowed out to the schooner. Also, the motor-boat was got ready, to tow the whaleboat and make greater speed, but Capt. Le Poigniere lifted anchor and raised sail, and came in close to the shore and beached his ship. This allowed the wagon to drive right up to the ship, and soon she was loaded. It was finished at 6.30 p.m., and soon after that she floated and started northwards towards Broome.

#### Going aboard the Geranium

About 2.30 in the afternoon W.W. Campbell, C.E. Adams, J. Evershed, L.H. Quick and myself started out for the Geranium, which was anchored about seven miles away, and the operation involved some interesting incidents. First, we had to walk out to the water and then wade out to clamber into the whaleboat, which then had to be rowed out to the motor-boat which then conveyed the party the considerable distance to the Geranium.



As a precaution I took off my pants, boots and socks, and held them high over my head to keep them dry. I still had on underclothes and a sweater, and just before reaching the whale-boat a great wave came rolling along and wet me to the neck. Starling carried the precious plates and the 'gins' my luggage. During the time I was in the motor-boat, in the sunshine, I got slightly dry and I put on my pants and boots before going aboard the Geranium. My fellow travellers had bare feet.

We were received very kindly by Captain McKenzie and his officers. One of them (Dixon) had taken lectures at Cambridge from Arthur Berry, the author of the History of Astronomy and he knew Puddycombe of Toronto. Baxter was from Adelaide.

I had a wash and shave and put on dry underclothes. Dinner was in the ward room and there was pleasant conversation afterwards. The ship's doctor gave me a tooth from a dugong. He also showed me a clipping about a plesiosaurus reported to have been seen in Patagonia.

I went to bed on the poop of the Geranium.

Wednesday, September 27, a fine day

I learned that Quick and Sharpe came on board at midnight. They had waited until the schooner had floated with the rising water and had set out on her trip to Broome. The Geranium started out about one o'clock in the morning.

I slept well. In the morning we looked for the schooner, but it was not in sight. Dr. Campbell was anxious and critical. We steamed ahead at seven knots, and at about 12.30 noon came



up to the schooner. She had made good progress in the morning breeze but was now becalmed. Our ship took her in tow and we went forward in procession. There was a lazy time on deck and we made out as best we could with the three chairs which were provided. In the morning three of the women which had invaded the warship- -Mrs Campbell, Mrs. Adams and Mrs. Chant - were not well.

The Geranium was built in 1916 as a mine-sweeper. It was now being utilized by H.M.A.N. for surveying, and at present the Captain was surveying Broome harbor. He explained to Dr. Campbell and me how he was doing it.

We expected to reach Broome about midnight and Quick had wired ahead that we would stay on board until 5 a.m.

#### Safe Arrival in Broome

When we wakened we were in Broome harbor. We got up soon after 6 o'clock and about 7 o'clock the Gwendoline's motor-boat called and took us and our hand luggage off. The water was almost at its lowest, but by transferring to the whaleboat we were just able to get to the pier. The whaleboat had to make a second trip to bring the rest of the baggage.

We all jumped on the little train to go to the town. We called for our trunks which had been in storage here while we were in camp, and then we made for the Governor Broome Hotel which was just a few yards beyond the Custom House. We expected to have to spend a week in Broome waiting for the West Australian Government steamer to call on her southward trip. Young had



reached the hotel at 5.45 a.m. Our rooms had been reserved for us and were very satisfactory. The hotel consisted of a number of separate houses, of one story, of corrugated iron. The roofs had considerable <sup>b</sup> area and the rainwater which ran off them was carefully preserved in numerous tanks, which were much in evidence.

While here a cable message came from Sir Robert Falconer, president of the University of Toronto, addressed to Dr. Campbell and myself, congratulating on our successful observation of the eclipse.

#### Developing our Plates

Our first business was to develop our plates. We visited Wada, the photographer, who offered us accommodation, as did several other persons, including our hotel. We decided to fix up Young's room for the purpose. A chief difficulty was to insure that the developing and fixing solutions, as well as the water for washing, should be at the proper temperature.

We got the carpenter Prior to make wooden trays which we lined with oil-cloth to make them watertight. From one of our boxes at the Customs House I got out chemicals and a drying rack. Keyser, the carrier, brought us a 100-gallon tank of rainwater which he got at the Court House and which cost us 10 <sup>sh.</sup> and Young ordered 14 lb. of ice to be made from rainwater. Such ice could actually be put into a solution to lower its temperature, not just around it to cool it. After considerable experimenting on several nights, we felt sufficient confidence to



develop the large plates taken with our big instrument at the time of the eclipse. They turned out to be of good quality.

After this we devoted an evening to developing some fourteen rolls of films which my party had taken with our private cameras. After washing them they were hung up to dry in the warm quiet air of one of our rooms through which a gentle current of air was moving, but before morning a breeze sprang up and blew some of them together. We had difficulty in separating them.

### The Bishop and the Magistrate

On the evening of Thursday, Sept. 28, we attended a reception given by Bishop Gerard Trower at his palace. He was a bachelor with a big house and we met many nice people. I had a long talk with Clarke Hall, a very active 'pearler' and he offered us all the rainwater we needed, but we did not have the means of bringing it to us.

Next evening a public reception was offered at the Residency by Col. Mansbridge, the Resident Magistrate. His wife was in Perth but his daughter assisted him. In reply to an address of welcome to the visitors, Campbell, Evershed and I responded briefly.

### Pearl Fishing

Naturally we were deeply interested in pearls and pearl fishing as Broome was the headquarters for that industry. On Saturday morning we all went up town to see some sample pearl jewellery. We bought two carved pearl blisters made into brooches, one at Elies' and one at photographer Wada's for 10/- each, and I bought five pairs of the beautiful big shells for £4.

Jean went home and Bessie, Young and I went to Mr. Clarke



Hall's office. He gave us much information and took us over to the shell sheds and also to a machine shop where compressors and diving suits were supplied and repaired.

On getting back to the hotel we found that the two blisters had been lost, and though we searched carefully they were not found.

Three days later Young and I went to the shell sheds again. The price mentioned was £150 per long ton. Young picked out about a dozen shells for which Mr. McNee juggled the price down to 5/- (instead of about 12/-). Mr. Hay (the proprietor) gave me a pair. On returning home we found four fine pairs for Jean and Bessie from Mr. Sewell. *They were simply beautiful!*

Next morning Jean went in a motor sent by Mr. Clarke Hall to see some pearls in the W.A. Bank, put there for safe keeping. She was greatly impressed with their size and beauty and number; also with the fact that many of their owners were not anxious to dispose of them, but they loved to keep them and admire them. In the afternoon we went up to see the re-compressing outfit for treating divers who have come to the surface too rapidly. A Malay went into the cylinder to illustrate how it works. The pressure admitted to him was only one additional atmosphere.

I learned the divers went down frequently to 20 and 22 fathoms, and sometimes to 27 fathoms. It was at these great depths that much of the pearl shell was then obtained.

#### Sunday Rest and Cricket

In the morning there was rest. In the afternoon we saw part of a cricket match and then went to Mr. Pigott's for afternoon tea.



Mr. Pigott and James made soda water, a necessity of the place, and he had a beautiful property with lovely oleanders and a croquet lawn, on which we played for some time, receiving instruction from Bishop Trower and Mr. McKenzie, a great tall Scotchman.

### Cable Beach

Next day Com'r Quick went with us to the Corroboree ground, near the Japanese cemetery and started us on the way to Cable Beach. It was a long three miles over hot sand through scrubby woods under a powerful sun, but we got there. On the way we kept a watch for Kangeroos and we did get a fleeting glance at two as they disappeared in the shrubs. At dusk, I was told, was the time to see them. The Beach is north-west from Broome across the peninsula.

We carried a lunch supplied by the hotel. What was <sup>in</sup> it in this tropical place? There were beef sandwiches, cheese ditto, 6 apples, 3 bottles to drink (2<sub>A</sub>soda, 1 plain water). The beach was fine and hard, but the sun was trying on my eyes, especially the left one. Indeed the eyes of both Young and myself had received some infection from the numerous flies at the eclipse camp and they required treatment with argyrol for some time <sup>after this</sup>.

In the evening of Wednesday, Oct. 4, a full-style corroboree was put on by the aborigines, but I did not go. I was feeling somewhat 'used up' from the trip to Cable Beach. The others reported that the show was very fine, the most elaborate yet, with graceful dances illustrating the pelican, cockatoos and other birds. The head-dresses were very fancy and the painting <sup>on</sup> of the black bodies (with cl very picturesque.



### Departure from Broome

The ~~s.s.~~ <sup>Bambra</sup> came in quietly at 9.30 p.m. on Wednesday, Oct. 4; and next morning while I was "taking a shower" Bessie called to me that the train going to the jetty was to leave at 7 o'clock! This was a false alarm but we lost no time. We got our baggage ready and sent off the trunk and <sup>the</sup> dunnage-bag, took breakfast before 8 o'clock and were ready to go.

I paid Mr. McKenna £8/8/- for board and 8/- for ice. We were well pleased with the Governor Broome Hotel.

Carrying our lighter luggage, and having in our company Mr. and Mrs. Drake-Brockman, we all walked to the jetty; except Jean who waited for the train, and Dewar, the policeman, insisted on paying her fare. The notice posted on the ship said she would leave at 9 o'clock. Many came to the dock to bid us good-bye,-- Clarke Hall, Col. Mansbridge and daughter, Elies the pearl-dealer, Ogilvie and others among our new and generous friends. We felt this was a historic occasion. After remarkable experiences on 16,000 miles of travel we were definitely starting for home.

The Bambra was a German prize, originally named Prinz Sigismund, and was captured at Derby in the Fitzroy River. It was a North German Lloyd ship plying between Hong Kong and Sydney. Now it was run by the W. A. State Government and really had not been reconditioned as the German names and notices throughout the ship had not been changed; for instance, Bad (bath), Frei (free), Besetzt (occupied). The stateroom assigned to Jean and me was No. 4 and was spacious and well furnished, having two lower berths, a basin, clothes-press and settee. The scientific party (about thirty)



had second sitting at meals which were quite good.

### A Motley Crowd

There was a big crowd on board, and our staterooms apparently had been in use <sup>immediately</sup> before they were given to us. Some ninety men who had been employed in a Government meat-packing establishment at Wyndham were returning to a more temperate climate; there were also two dozen racing men and numerous miscellaneous passengers. Many were sleeping on stretchers and some on the open decks.

Some of the 'sports' were almost continuously drunk and they were noisy at the table. After dinner on the first day I accidentally bumped into one fellow and looking round I said: "I 'beg' your pardon". Said he: "That's all right! I guess you are old enough to work and not to 'beg'". Somewhat later Jean came across this same fellow and made a courteous remark to him. Said he: "Oh! I had two drinks too much to talk to a lady to-night. I speak to you to-morrow". A couple days later I learned that this person's name was Frank Gardiner and found out something more about him. He was proprietor of a station north of Broome and was on his way to Honolulu to meet his friend's mother from Seattle, and perhaps he might go on to Seattle, too. I believe he had £2700 in cash and £5000 in securities, which he had deposited with the purser. He was pretty noisy the first day or two, but the bar on the ship withheld some liquor and he became a little quieter. It was expected that he would squander all his money before he would go back. Then in about three years more he would repeat the performance. He remained nearly saturated all the time

### Not Mosquitoes

On the second morning (Oct. 6) I found some bites on my hands



which at first I thought were mosquito bites which I had got at Broome, although I had not noticed them the day before. Later, I learned that Hosking had seen some <sup>bedbugs</sup> bedbugs in his bunk and that he had transferred to the floor! The stewardess visited Jean and inquired about bugs; she said she never had any trouble with cabin No. 4. She put turpentine about my cot!

Ross spoke to the Chief Steward about the drunks and he said there would be no further trouble. The room stewards were not very obliging or helpful. They were all white men and were not so attentive as the Chinese on the Charon. Dr. Campbell had trouble about his trunk; and Starling and I carried our trunk down to our stateroom. The matters of white citizenship and trade-unionism were live questions in Australia, and I don't think government management was economical.

#### Port Hedland and Point Sampson

At about 10 a.m. we reached Port Hedland, the tide still rising. We went ashore and I cashed a cheque for £10 which I had received at Wallal for the cotton duck used for the wall and roof of our observatory. Bessie bought a spider-and-tiger cowrie shell at Pilkington's Hotel for 2/6 and Young picked up a similar kind of shell for 6d. The ship took on some asbestos (in bags) and also what looked like chaff. We left again in an hour.

We went steadily forward at 11 or 12 knots and reached Point Sampson at about 8 p.m. The full moon was beautiful over the water and the ship sparkled with the electric lights all over it. Here we dropped our sporting fraternity and their seven racehorses, which



were led up a passage-way from a lower deck to the jetty.

Then by means of our steam derrick a big Buick runabout was lifted onto the ship, and, after that, 42 horses were taken on board. These were being shipped to Fremantle for sale. They were fine-looking animals, not broken in at all. They were driven along a fenced-in passage on the jetty and then through an equally narrow passage-way down onto the lower deck. They were helped along by light goads (which did not injure them) and also by an "electric tickler" -- 200 volts of A. C. They belonged to Mr. A. E. Neaves who was a passenger on the ship. He expected to get £20 apiece for them. Mr. Neaves had a 600,000 acre station some 35 miles from Roebourne. He said that in the case of cattle, he preferred to drive them to a railway line. Men took the contract to deliver them at 25 sh. per head, and it required five men to handle 650 head.

Many passengers looked on while a considerable number of the horses were being loaded and then went to bed. I turned in about 11.20. The racket continued for half an hour longer; then the whistle blew three blasts, the triangle was sounded to warn the visitors off the ship, and we started forward again.

Several passengers came aboard at this place, brought to port, along with many of their friends, by the dinky engine and cars which runs to Roebourne (11 miles). Amongst them were women and children, in one case a baby in arms! It was late getting back home!

I was impressed by the stature of the men around Port Sampson, many being over six feet tall. Com'r Quick said that tallness was a characteristic of the men on the north-west coast.



### High Tides and High Jetties

I was informed that at Broome on Sunday, Sept. 24, (three days after the eclipse), the tide rose 33 feet, while the usual height for a spring tide there was  $26\frac{1}{2}$  feet. At Sampson and lower ports a ship could make her way irrespective of the state of the tide. The piles in the jetty at Sampson were very long, usually made from two trees spliced—30 feet being in the mud and 40 feet above it! At Hedland we saw men sheathing a pile about 50 feet long. It was pointed with iron, covered with pitch and then sheathed with brass. Certainly very expensive.

We reached Onslow next day (Sat. Oct. 7) soon after 4 p.m. A lighter named "Colliar H.M.C." (His Majesty's Customs) came alongside us and took off a large quantity of jarrah for the new jetty. It had been carried past on the up trip. It was in heavy planks 3 or 4 inches thick, as a rule, and was hard to handle. The water under us was shallow and the mud was stirred up.

A lugger with auxiliary engine also came and brought the mail as well as a 'big bunch' of people. One woman got on the ship, and I was told about 15 others wished to do so but there was no room for them.

Kenny, one of the navy men, introduced us to Father Creagh, of the Beagle Bay mission, about 75 miles north of Broome. After dinner, escorted by the First Mate, we went up to Creagh's room and had a pleasant visit. He gave Jean and Bessie some fine cowrie shells. He understood that the two women had been especially kind to the men at the camp. These shiny shells had been retrieved alive from the bottom of the sea and they have ornamented a mantel in our



house ever since (1952)

Carnarvon Again (Sun. Oct. 8)

On board ship was an elderly gentleman from Queensland who had been examining West<sup>ern</sup> Australia to find out if the growing of cotton could be introduced there. I am not aware that this has ever been done. I learned that our investigator was an expert with the divining rod!

We rounded N. W. Cape about midnight and passed the Gorgon on her up trip at about 3.30 p.m. The two ships dipped flags and then raised them together.

We reached Carnarvon about 8 p.m. It was quite dark but the moon came up and brightened the place. Here we actually took on 3015 sheep for Fremantle. The men stayed on the job all night and finished at 8 a.m. (Monday). One of the men sat there all night counting those sheep as they hastened past him. He was surely pleased to see the last one!

Among our experiences I may remark that we usually began breakfast with passion fruit, but here we tried mango and liked it better.

About 40 passengers wished to board the ship but only a few shearers, who were going a short distance, were allowed on.

At the jetty was a whaling steamer loading jarrah logs for Cloate's Point, (on the coast about 250 miles north of Carnarvon) where the whaling station was.

Denham in Shark's Bay

Carnarvon is at the mouth of the Gascoyne River, at the north end of the east side of Shark's Bay, and we left it at 8 a.m., four hours later than we had expected. We made for the south end of the



bay, and about 4 p.m. we tied up in Denham sound. Denham town could be seen about two miles away to the east on the sandy shore, with its white and brown roofs. It was the outlet for the neighbourhood and the Bambra was the only ship which called, --and that was once in three weeks.

Awaiting us was a schooner piled high with bales of <sup>wood</sup> wool. Two other schooners (one with an auxiliary engine) and also a motor boat carrying the mails came alongside. It was quite a visitation. Among the many people were the policeman, his wife and baby.

Included in the freight which we took on were about 150 bales of wool, all bearing the name "Tamala" and some 30 bags of shell addressed "A.H.L." (London). This pearlshell from Shark's Bay was of a yellow species, much inferior to the larger white variety obtained at Broome.

A number of passengers came on board, being lifted there in a big basket by the ship's derrick. They included five girls who, with two or three already on before them, occupied the writing room. Our crew finished taking off the schooners' cargoes at about 10 o'clock. They then rested for refreshment, after which some iron piping and other goods were loaded on one of the schooners. That did not take long, but as the water of Denham sound is shallow and there are many sandbanks, the steamer waited until 5.45 a.m. (Tues. Oct. 10) before starting out.

#### Dirk Hartog and Cape Inscription

We had to go back, somewhat north-west in direction, about fifty miles to go round Cape Inscription on the north end of Dirk Hartog I. into the <sup>open</sup> open sea. It was about 10 a.m. when, having left the quiet



water of Shark's Bay, the ship got into the Indian Ocean where she pitched about considerably.

On Cape Inscription there was an automatic light-house and near it was a small area fenced off. Within this <sup>enclosure</sup> Norris, the 2nd officer, told us, was the "inscription". In Scott's "Short History of Australia" (p. 19) it is stated that Dirk Hartog, a Dutch sea captain, landed on the island which bears his name and erected a post and nailed to it a tin plate upon which was engraved the record that on Oct. 25, 1616, the ship Eendragt (concord) from Amsterdam had arrived there and had sailed away on Oct. 27. This plate was found 80 years later by Capt. Vlaming and was sent to Amsterdam, and he erected another post and plate in place of it. This latter plate remained until 1917 when Capt. Louis de Freycinet took it away to Paris.

The Dirk Hartog I., about 50 miles long and 10 miles wide, we learned was owned by three Melbourne returned soldiers who had bought it for £7000, and on it <sup>there</sup> were 30,000 sheep.

#### Horseback from Winnipeg to Montreal

Our room steward told Bessie a rather 'tall' story. He seemed familiar with Winnipeg, Toronto, Montreal and Ottawa, and said that forty years before this, which would be in 1882, he missed a train at Winnipeg, his ticket being carried on by a friend, and he said he rode on horseback to Montreal! The distance from Winnipeg to Montreal by C.P.R. is given as 1409 miles. What his mileage would be I cannot say.

We came into Geraldton about 9.30 a.m. (Wed. Oct. 11) and stopped only 15 minutes. Hosking got off, intending to visit the Watheroo Magnetic Station, which was established by the Carnegie Institution



of Washington to study the magnetism of the earth. It is 160 miles from Perth and 11 miles by sandy road from a railway.

#### Back to Fremantle and Perth

It was at 6 a.m., Thursday, Oct. 12, that the ship arrived off Rottnest island but we did not move in to Fremantle until 8 o'clock. After breakfast on the ship we said good-bye to Capt. Clayton, First Off. Turner and others and put our luggage in the hands of the Frank Cadd Co. to be taken to Perth. This was the end of our historic voyage on the west coast.

Dr. Gray took my family to Perth, on the way passing again through King's Park, a thousand acres in their natural picturesqueness. Dr. Young had been met by Knapp, the optician, and had arrived before us. The Esplanade Hotel management had reserved rooms for us, although the city was crowded with visitors to the Royal Agricultural Exhibition at Claremont, between Perth and Fremantle.

In the afternoon Mr. and Mrs. Mathews called bringing clothes which had been left in their home during our absence, and Jean and Dr. Young went with them to the big fair. Somewhat later a big Buick from the Premier's office conveyed Bessie and me there. It was a creditable exhibition, especially of live stock, but there was no lack of side-shows. For example I noted these signs:-

- The American Giantess, the fattest woman on earth, 32 st. 9 lb.
- > Happy Jerry, the jungle entertainer - half human, half beast - the missing link. The most extraordinary animal alive.
- > Boxing Ross Brothers, the World's Fistic Monarchs.

We were overwhelmed with kind attention.



In the evening I went to the railway station to bid farewell to Dr. & Mrs. Adams, leaving for Wellington, N.Z., and to several of our naval men returning to their posts at Melbourne. There I joined the members of my family at the home of Mr. Parsons, the principal of the Modern School, and heard an 8½ year musical genius whom his parents expected to take to New York to study the violin.

#### Perth Observatory and a Special Convocation

Next morning Young and I went to the Perth Observatory to pick up some night plates left there by Trumpler. We met H.B. Curlewis, the director, and E.B. Curlewis, the state meteorologist, and were shown over this fine institution. The corner stone was laid in 1896 by Sir John Forrest, one of the most distinguished explorers and, later statesmen of Australia. The equipment included a 13-inch astrographic instrument and a 6-inch meridian circle by Grubb. The latter and its house, which was full of louvres and was broad-based on the sand, <sup>were</sup> ~~was~~ designed by Sir David Gill. There were also chronographs by Grubb. Indeed it seemed that Grubb had almost a monopoly in equipment for observatories in the southern hemisphere.

We also visited the Geological Survey and the Museum, to express our thanks for assistance received.

In the evening Dr. Campbell gave a lecture on "Solar Eclipses" in the ball-room of Government House. We were favoured with seats near the front. The degree of D. Sc. (Hon.) was conferred on him by Chancellor Saw of the Univ. <sup>of Western Australia</sup> of W. A. Dr. Campbell did not appear to be as much at ease as he was at Adelaide, but the audience were pleased with his address.



Among those I met after the lecture was W.J. White, a graduate of the School of Science in 1909. He was originally from South Australia. He went to Schenectady for training in the G.E. Works and then over to the U. of T. for his college course. He was an enthusiastic Toike-oiker. He had a position with the G.E. branch in Australia.

#### Final Duties, Taking Leave

The morning of Saturday, Oct. 14, was spent in making odd purchases, in packing for our journey, in despatching telegrams to Adelaide and Melbourne accepting kind invitations of hospitality, and sending a cable-message to our friend Prof. A.L. Langford in Toronto on the death of his wife.

In the afternoon Mr. J.J. Simons, M.L.A., called to wish us a safe journey home, as he had welcomed us to their "Great big West" on our arrival in West<sup>ern</sup> Australia. He wished me to convey his compliments to his Toronto friends J.L. Hughes and T.L. Church.

The ladies went to the Karrak<sup>a</sup>otta Club where they gave some report on their experiences at Wallal, while Young and I attended a meeting of the W. A. Astronomical Society, which was to welcome back the people from the Eclipse Camp. Nossiter, Campbell, Quick, Hargreaves and I spoke. I had a very cordial reception.

We left for the station at 8 o'clock and many were there to give us their good wishes. Among them was a Mrs. M. L. Johns, an Englishwoman whose father was Dr. Chant of Somersetshire, whence my father came. She brought as a gift a beautiful hand-knit w<sup>o</sup>llen scarf to keep me warm in Canada. Her daughter, Mrs. McCarthy was a teacher at Coolgardie and would be on hand to see us there. The train



left at 9 o'clock. It was, of course, of the <sup>Western</sup> W.A. Government railways and of 3 ft. 6 in. gauge, and the accommodation was very good.

In the morning at Southern Cross, 236 miles from Perth, we stopped to take on a dining car. At Coolgardie, Mr. and Mrs. McCarthy were there to see us. Mrs. McCarthy promised to send to Bessie a lance which had been used by her grandfather, Dr. Chant.

We reached Kalgoorlie, 375 miles, at 2.15 p.m. and changed to the transcontinental train on which, as usual, the service was superior. We left at 2.38.

There was an extra 'carriage' on this train to accommodate the people on the way to Melbourne to see (and bet on) the races for the Melbourne and Caulfield Cups. Caulfield is a suburb of Melbourne. In the evening there was music in the lounge car where we had coffee. There I met D.W. Brisbane, a civil engineer from the Malay States, formerly of Perth. He was on an 8-months' furlough, two months being allowed for each year of service. In addition to talking about his work, we discussed free University education.

### Across the Desert

The night was cool but our compartment was comfortable. Morning tea (declined). Hot water. We reached Hughes (484 mi. from Kalgoorlie) at 7.22 a.m. (Mon. Oct. 16). Last evening there were eucalyptus trees everywhere, 50 or 60 feet high, very picturesque. Now, sand and spinifex, and I took a number of photographs. Fisher (572 mi. from Kalgoorlie) is at the eastern end of the long straight stretch of line and a photograph of it gave an impression of distance. Between Fisher and Ooldea (52 miles apart) a mirage was seen on each side of the railway. There seemed to be water over near the horizon.



There were many 5-gal. U.S. oil cans and empty bottles where various contractor's camps had been located. The trees began again at Oldea, where Mrs. Daisy M. Bates lived. On the train I wrote a letter to her and on arrival posted it. I found she was living half a mile from the station. Before leaving Australia I received a long interesting letter from her, along with a parcel of aboriginal articles.

We left Barton at 3.10 p.m. (50 min. late) after a stop of 20 minutes. At this place Bessie photographed a horse-tail tree or belah or black oak. We left Wynbring at <sup>5.15</sup>~~5.15~~ p.m. Here we saw more of the mulga trees, on the foliage of which sheep, cattle and camels can exist. Pepper trees also were about. On a notice board at the station was a <sup>record</sup> ~~second~~ of the rainfall for the year to date, namely <sup>2.88</sup>~~2.88~~ inches, which was much less than usual.

#### Port Augusta to Terowie to Adelaide

We reached Port Augusta about 5 o'clock in the morning. This place, at the upper tip of Spencer Gulf, used to be an important sea-port, steamships and schooners coming to take off wool and other produce. Since the extension of the railways it had fallen somewhat from its high estate. The scenery about it reminded me of Fort William.

This was the end of the Commonwealth's standard-gauge railway, and the next link in our route was the 120 miles of narrow gauge line to Terowie. We did not leave Port Augusta until 8.30, apparently because the railway employees would not begin the transferring of the baggage until 8 o'clock. Then they carried the trunks, mostly of the flat 'steamer' variety, on a truck, one at a time, across the platform, a distance of 50 feet. We got off at last!



The country we passed through was rolling, almost mountainous in places, with fine fields and river-beds fringed with gum trees. At this time they were mostly dry through shortage of rain. I thought of California.

Quorn was reached at 10 a.m. and we stopped for 15 minutes. At the station was the mayor to meet us. He was a native of Dunfermline and settled here in 1879, coming from Port Augusta by stage coach. He had been mayor for 21 years.

At this place there occurred an odd incident. A passenger on our train named Sinclair, said to be a newly-wed, was left behind. By hiring a Hudson-six motor-car he overtook the train at Orroroo, at which place we arrived at 1.20 p.m. The meeting of man and wife was amusing.

At Eurelia we stopped and ate a good lunch (2/6), and left about 1 o'clock. At 2.15 we came to a fine town bearing the familiar name of Peterborough and reached Terowie at 3 o'clock. Here we changed to the wide-gauge system of South Australia and Victoria and left at 3.17 on time.

The country between Terowie and Adelaide (140 miles) was much like our old Ontario. At this time — a month after their spring Aequinox — the grass was green and there were many fields of wheat, which later on would be dry and yellow. The fine stone homesteads, with eucalyptus trees about them, and the abundance of sheep to be seen suggested permanence<sup>ce</sup> and prosperity.

On the train was a man with a baby wallaby (small Kangaroo) which interested his fellow travellers. His name was Martin, from near Adelaide. He had been shooting Kangaroos near Katanning in the south-west corner



of Australis to make a rug and had shot this little fellow's mother by mistake. He then made a bag out of the mother's skin and put a wire at the top to keep it open, and put baby in. They fed it milk from a bottle which it held on to with its little paws. It took it too fast and hiccoughed. He dumped it out on the floor; it was very tame, with lovely soft fur, pointed nose, big ears and huge back legs. When he held the bag in front of it, it plunged in head first but turned a somersault and came up ready to look out on the world.

#### Beautiful Adelaide Again

We reached Adelaide at 7.50, on time; and at the station to meet us were Kerr Grant, Cremer, Dodwell and Sharpe. Dodwell took Dr. and Mrs. Campbell up to his house in the big Government car which soon came back and took us to Kerr Grant's, to which we had been invited by telegram some days before. It was a great privilege to have two days of rest in such a gracious home.

Next morning I visited several book-shops, looking chiefly for Spencer and Gillen's work on Native Tribes of Central Australia (1899) but did not find a copy.

There was a luncheon at the Observatory, served under the trees, and as usual Dr. Campbell made an appropriate speech. Then Director Dodwell made some remarks, continually prompted by his wife.

In the evening a motor took us to the residence of Hon. David J. Gordon at Unley Park, a suburb. He was a member of the Legislative Council and the author of several important works on South Australia. It was a pleasant visit. As indicating how some families entered into the life of the nation, I learned that one son was employed in the motor-body works, a daughter had just graduated as a nurse, and another



son was on a station some 400 miles north of Adelaide, where severe drought was at that time being experienced.

Next morning we called on Premier Barwell and met Hon. Mr. Pascoe, Minister of Agriculture; and on the street we met Lady Barwell. Lady Stirling had invited us to be her guests when in Adelaide, which was impossible. But at 2.03 p.m. we took a local train for Mt. Lofty and had a pleasant afternoon with Lady Stirling, then within a few days of 74, and her capable daughters. One of them was a nurse for some years in a Casualty Clearing Station at Saloniki, and she had just come home from Java. We left at 9.30 p.m. for Melbourne.

#### Melbourne the Imposing City

On Friday, Oct. 20, at 1.03 p.m. we reached the big city, where we were busily engaged until 5 p.m. of the following day. My party had been invited to be guests at Sir Thos. Lyle's palatial residence. At the station we were met by Comm'r and Mrs. Quick and others, and as soon as our baggage could be disposed of, the women went in Lady Lyle's motor to the Lyle mansion, "Lisbuoy", on Irving Road, while Young, Moore and I went to Menzie's to a luncheon of the Get Together Club. This was an elegant affair, a number of distinguished persons being present. The U.S. Consul-General was in the chair. Dr. Campbell, as usual spoke well and I added a few words of appreciation.

Then we went to tender formal thanks to Admiral Everett for the great assistance to our expedition which had been rendered by the Navy. The Admiral was at a meeting of the Navy Board, but he came out to his office and we had a pleasant conversation with him.



After this I had to get together evening clothes (which was quite a task) and I called at the Herald office where I met Mr. Murdock and Mr. Taylor. They complimented me on the contributions I had sent to them during our expedition, especially the telegraphic despatch summarizing what had been accomplished at the time of the eclipse. I was given £20 and the clippings.

Then I drove to Sir T. Lyle's and got ready for his dinner at the Melbourne Club. This also was an elegant occasion, from which however Dr. Campbell had to stay away on account of a cold, or influenza, which had attacked him. Among others present was Chief Justice Irvine who was an able student of Relativity. He sent me an elaborate essay on the Einstein Theory, to engage my attention on the voyage home. I had also an interesting conversation with <sup>Vice-</sup>Chancellor Sir *John* Grice\*. I drove home with Sir T. Lyle and we found that Lady Lyle had taken Jean and Bessie and her Melbourne friend Margaret Cunningham to the theatre where they saw Ada Reeves in "Spangles".

In the morning (Sat. Oct. 21) Young, Moore and I addressed a meeting at the University, chiefly of students. Prof. T. Laby was in the chair. We had lunch at Lyle's, Moore along with us. He had come (along with Lyle) to see Dr. Campbell, who had been advised to delay his visit to Sydney until Monday.

After this we drove to the Spencer Street station, where I had some hustling to get our trunks checked. There were plenty <sup>of</sup> baggagemen but I think they all wanted tips. I gave 5 or 6 shillings before it was all "fixed up". At the station were Baldwin, Mirfield and many others to say good-bye.

\* Present at this dinner were: Sir John Grice, Chancellor, Univ. of Melbourne; Sir Wm. I. James, C.T. of Victoria; W. Russell Grimwade; Orme Masson, Prof. Chemistry; H. A. Hunt, Com'r Meteorology; Dr. J. M. Baldwin, Melbourne Observatory; J. H. Moore, R. K. Young, C. A. Chant; Thomas R. Lyle.



We left at 5 p.m. and our accommodation was excellent. We reached Albury (191 miles) at 10.21 p.m. where we changed trains and we proceeded at 10.40. At albury I received a telegram from Comm'r Quick saying he had been unable to reach the station to say good-bye, <sup>indeed</sup> which we regretted as he had been a very helpful friend.

### Busy Days in Sydney

We reached Sydney on Sunday morning at 10.45 and at the station to meet the party were Messrs. Cooke, Gale, Nangle and David. Prof. Cooke drove my party of four to the Metropole, where we would stay until we should sail on Thursday, Oct. 26. In the intervening four days we had some interesting experiences.

In the afternoon Sir Edgworth David came in a car, along with Nangle and Gale and Moore, and took us for a drive around Sydney's marvellous beaches, and then to Gale's house on Carrington Rd. Rd. for tea. My party got back at 6.45, in time for us to go to the service in the church on Philip St. where Editor Fletcher's family attended.

Next morning we looked after our ocean tickets and the shipment of our apparatus. I met D.O. Ramsay<sup>m</sup> and G. Johnston again, and also Mr. Bunting, the manager of the Canadian Government Marine in Auckland. He was a son of C.W. Bunting and a brother of W.H. Bunting of '92, captain of Varsity Football team.

With Jean I went to see Dr. E.A. Brearly, 141 Macquarie St., "Ophthalmic Surgeon". He examined my eyes and said the ailment was "sandy blight". He injected something and gave me a prescription, "Argyrol + 6 aq. dest.", which we got at a drug store.



On Tuesday Jean and I called at the Observatory, as also did Young, before us, to return two eyepieces which had been loaded<sup>n</sup> to us. Prof. Cooke's photographs of the eclipse were not very satisfactory which he attributed to a faulty driving worm. Next we went to see Prof. A. A. Lawson's magnificent new <sup>University</sup> Botanical Laboratory, then to the Refectory for tea, and then at 4 o'clock to a lecture room where some 400 persons, mostly undergraduates had gathered. I described the trip up the west coast, Young spoke for 10 minutes on polarization of the corona and Moore had 30 minutes for coronas and spectra.

Following this meeting we drove in the Vice-Chancellor's big car to Circular Quay where at 6 o'clock we all went (by ferry) to North Sydney and had dinner at Gale's apartment — 14 of us: Mr. and Mrs. Gale and Marian, Mr. & Mrs. Hoskins, Brown, Capt. and Mrs. Rolls (of s.s. Niagara), Nangle, Moore and my party of four.

After this Gale, the Hoskins, Moore and we four went in a big car to Chatswood, some five miles away, to attend the meeting at which Prime Minister Hughes was to read his "policy" speech. We were late but were passed in at the back door and we listened for about an hour. For much of the time I was standing about seven feet from the P.M. It was a historic meeting. We returned home by railway and then by ferry.

On Wednesday morning at 9 o'clock Bessie and I reported to Dr. Brearly. He examined my eyes and said satisfactory progress was being made — fee, 2 guineas! We also visited several second hand bookshops and made several purchases, Among these was the one-volume edition of



the "Works of Tennyson". It was the impression of 1902 and ran to 900 pages. In 1879 I received as a prize the works of the great Poet Laureate and had long been one of his devotees —and shall always admire him. On our long voyage <sup>home</sup> I wished to enjoy his <sup>well-known</sup> famous productions. I bought it at Tyrrells on Castlereagh St. and paid 8/6 for it.

I also bought a blue ensign Australian flag, 27 x 60 inches in size; and on this day there came from Com'r Quick the Canadian Ensign which had been flown over our tents at Wallal and which I had expressed a great desire to preserve as a souvenir. The Commander was able to secure it for me but was unable to present it to us at the Melbourne station. Also, a parcel of aboriginal articles came from Mrs. Bates of Ooldea. All these things I prize greatly.

In the evening we went to a meeting of the Sydney section of the British Astronomical Association. Dr. Campbell gave a good address and Mr. Gale showed some slides illustrating the work of his party at Stanhope. Among others I met was Father Piggott of River-view who was very cordial.

#### Boisterous Tasman Sea and Interesting Auckland

The morning of our departure (Thurs. Oct. 26) was fine. An express man took away our baggage —four trunks and a dunnage-bag. Then we went by motor to Pier 5, Darling Harbour. We put our bags on the ship and saw that our trunks were taken aboard also.

A big crowd had gathered on the dock and there were many bright-coloured <sup>paper</sup> ribbons to tie us to our friends. Gale and daughter Marion (with <sup>flowers</sup> bouquets for Jean and Bessie), Nangle, Adams, Piggott, Cooke and others had come to see us leave. We looked on them as valued friends



in this "down-under" portion of the earth.

At 11.10 the ship was moving from the dock. Slowly the ribbons lengthened until at last they parted and we were off!

While still within the spacious harbour we underwent a quarantine inspection, each one passing along and holding up the bare arms. If one has the bubonic plague he cannot easily raise the arms.

The weather on the crossing from Sydney to Auckland was rather unpleasant. Mr. & Mrs. Bunting were both on board and I had long talks with them about Toronto and its people, among them W. Lash Miller '87, Miller Lash '94, the Moss's, Britton, Primrose, Oille, Rudolf, Cameron and others. I also read some of Sir William Irvine's MS. on Relativity and made a beginning into the Tennyson volume.

During the night of Sunday- Monday the ship travelled slowly so as not to arrive too early in Auckland. A notice asked us to parade through the smoking room at 7 a.m. for Quarantine. As before, we pushed up the sleeves and raised the arms. After that we presented our immigration papers to the proper "blue-buttons" and were then free to go ashore.

At 9 o'clock we got off the ship and walked up Queen Street. At once Jean telegraphed to Mrs. Charles Laidlaw, the New Zealand wife of a cousin she had met in England in 1898; also to Mrs. Craig's house, and was informed that Mrs. Craig would be at the office at 11 o'clock. After some shopping we went to the office and Mrs. Craig expressed pleasure in seeing us. It was arranged that her daughter Jessie, in their car, would pick us up at the office at 2.30 p.m. and take us to see our friends.



After lunch we went to the Graig office and soon Jessie came. We (my family of three) went first to Laidlaw's. Cousin Charles was not at home, being down in Wellington at the funeral of Mrs. Laidlaw's brother. Mrs. Laidlaw's sister was with her. We had a pleasant visit and afternoon tea. Then we drove to Mrs. Bunting's house, 18 Bassett Road. Besides the two daughters, 13 and 15, there were Mrs. (Dr.) McGuire and Miss McGuire. We had another pleasant visit and afternoon tea. After this we drove to the steamer. One is blessed in kind and generous friends.

That evening Dr. and Mrs. Campbell and my family went to the Princess Theatre and saw a film entitled "Sunken Gold". The pictures were said to have been taken under water; but I made a note that the plot was ridiculous.

I have wondered if I properly appreciated that film! Five months before this date, namely on May 20, 1922, at 7 p.m. the P.&O. Liner Egypt was struck by the <sup>ship</sup> ~~s.s.~~ Seine in a fog in the Bay of Biscay and was sunk, with 230 persons saved, 96 lost. It happened 25 miles west of Ushant Island.

The ship's cargo included 10 tons of silver and 5 of gold, in bars, the total value being £1,054,000.

The photographs shown on the screen were probably obtained in experiments made to find a way to salvage this great treasure. But it was not until August 1928 that the contract to recover it was given, and it was not until June 22, 1932, ten years after the sinking, that the first gold was salvaged. A book entitled "Egypt's Gold" gives full details of how it was done.



Insert at (B) p 600

On Monday, Oct. 30, the day of our arrival,  
I received by Cable from Mr. Mason at his  
home in Lismore, N. S. W., the following message:

Professor Chant, Niagara,  
Auckland

Safe home, long life and health serene  
To Mother, Father and young Gurlen  
Masons



But the <sup>ship</sup>~~ers~~ Niagara on which we were then passengers provided a similar story, and not far from Auckland. On June 19, 1940, this ship, carrying a fortune of \$10,000,000 in gold ingots, struck a floating mine off the coast of New Zealand while outward bound for Vancouver, and sank in 470 feet of water. Having the experience of the Egypt to guide them, an Australian expedition recovered this treasure. The job took 11 months and 21 days and not a man was injured.

New Zealand being famous for its travelling rugs, my family bought one from Mossgiel Mills near Dunedin and D. Young one made at Kiapoi near Christchurch.

#### On the Way Again

At 12 o'clock on Tuesday, Oct. 31, the ship's lines were thrown off and a tug pulled her out from the dock, and we were off. The passenger list gave 105 in First Class and 79 in Second. We were due in Suva on Nov. 4, Honolulu Nov. 11 and Vancouver Nov. 18.

A sports committee was organized at once. I spent much of my time in reading Justice Irvine's MS. on Einstein and the Tennyson Volume. The former I found very good but there were some misprints in his mathematics which made me go slowly. As to Tennyson, he had been a favourite for many years. My first contact was with a complete Canadian edition which I received as a prize in 1879. I started on "The Princess", always attracted by its exquisite diction and its intercalary songs.

The sky was overcast much of the time, but as we went northward towards the equator the weather got milder. The ship tied up to the



dock at Suva some hours before we rose on Saturday, Nov. 4. On the previous evening Capt. Rolls remarked that there were only two kinds of weather at Suva - wet and rainy --but it was fine all the time we were in port.

We had breakfast at 8 o'clock and then we 'stormed' the town. Bessie bought a tortoise-shell wristlet for her watch, a book and some shells; Jean got some beads and a basket; and I picked up two books from a second-hand collection left behind by a government official when he went back to England. One was Thoreau's "Walden" (Camelot Classics, 1886) in the edition by which I became acquainted with this author but which was stolen from me on a tram car; the other was "Miracles and Modern Spiritualism" by Alfred Russel Wallace (1875). Pasted on the front fly-leaf <sup>of the latter</sup> was a photographic print and under it was the following: "Original portrait of the spirit form 'Katie King', photographed by Prof. Crookes by whom it was given to me. Taken in his own study, medium, Miss Florence Cook". The former owner of the book was Mrs. Lenox. Like everything else Wallace wrote, it was very interesting. He did not hesitate to give his beliefs.

I got into conversation at a saw-mill and carpenter shop, and the manager R.B. Watson presented me with some samples of beautiful tropical woods, which I later donated to the Forestry Faculty of the U. of T. When we got back to the ship there was a big crowd. A brass band was playing and the natives were diving for coins.

The next day was Saturday, Nov. 4, repeated. The Makura met us on our left about a mile away at 9.30 a.m., and I sent to the captain



the following wireless message:

[ Crawford, Makura  
Thanks message received Wallal. <sup>met</sup>  
Observations successful. Till we <sup>^</sup> again.

(  
Chant

### A Fine Day; a Calm Sea — Sunday, Nov. 5

At 11 o'clock a service was held in the First Saloon. Capt. Rolls read the service, an officer reading the two lessons. The collection was £4/15/-, surely a creditable offering.

As usual, I read the Einstein MS., and, on tiring of it, "In Memoriam".

At 3.30 p.m. on Monday we passed on our starboard, at a distance of 8 or 10 miles a great collection of coral islands. On them were very few trees, no inhabitants. On Tuesday at about 5 a.m. we crossed the equator. The ship "bumped about" but no harm resulted!

The deck games continued and I took part in the tournament. It was completed on Friday, the 10th, but I did not win a single event. However, Bessie was successful in two and Young in five — far ahead of any other person.

### At Honolulu

We lined up on deck at 6.45 a.m., Nov. 11, for quarantine. There were two more steamships in the bay, <sup>namely</sup> Nile of Hong Kong and Nanking of San Francisco. At last we pulled up to the pier, and after a further wait got ashore. The Campbells and Moore were changing ships here, to go directly to San Francisco, and we left them with their baggage. <sup>while we went uptown</sup>  
About 40 first class and 30 second class passengers got off.

Our former Ontario friend Miss Gladys Wilson met us and took us up to the shops, most of which were closed on account of Armistice Day.



Then we took tram to the Aquarium where we saw the fancy coloured fish again, and after this we went to the Outrigger Canoe Club where Miss Wilson and her brother's wife tendered us lunch. We had a pleasant visit with them. At this Club we met Alexander Hume Ford, well known for his devotion to Pan-Pacific affairs.

Then we took car to the steamer, and of course ran amongst the natives selling leis or garlands. Just after we got back Dr. and Mrs. Campbell came with four garlands which they put around the necks of the Canadian Party. We bade good-bye to them and to Dr. Moore and went aboard. The natives, as usual, were diving for coins and some jumping from the bridge of the Niagara. We left at 4.30 p.m.

Upon the ship we found Mr. & Mrs. Thomas Roden of Toronto, Mr. F.C.T.O'Hara of Ottawa and Mr. Wrigley of Vancouver. They had been delegates to a Pan Pacific Commercial Conference in Honolulu, organized by A.H. Ford. The Rodens recognized me and introduced us to the rest.

### Victoria and Vancouver

The captain now set his ship on a north-easterly course to Victoria (2343 miles) and soon we noticed a change in the weather. The sky was more often overcast, the sea was rougher and the temperature gradually fell. On Nov. 13, the officers all appeared in their dark blue uniforms and the white covers were removed from the chairs in the dining room.

On Nov. 16, the steam-heating system of the ship was put in operation and it was made very comfortable. The northern sky at night began to look quite natural again, and for the first time in some



months I saw the "Big Dipper" in its familiar position well above the northern horizon.

On the following day the ship tossed about very considerably. We packed up some of our belongings as we had been notified to parade at 7 o'clock the next morning.

On Saturday, Nov. 18, I looked out at 6.30 a.m. and saw land close at hand. The ship's engines had stopped and we were off Williams Head, the quarantine station. We lined up and soon were passed.

Then we went on to the Outer Wharf at Victoria. J.S. Plaskett, Mr. & Mrs. Harper and others were there, looking for us and we had a hearty reception. I went in Plaskett's motor and we drove around town until 10 o'clock when we went to 'his' bank and I got cash in dollars for my bill of exchange in £ which I had obtained in Sydney; and after a little more seeing of the town we went back to the dock, as the ship was to sail at 11 o'clock. Leaving Dr. Young behind, to resume his work at the Dominion Astrophysical Observatory, we said good(bye and were soon on the way to Vancouver (83 miles) which we reached at 5 p.m.

We distributed our "tips" to the various stewards on the ship and all seemed pleased. After making sure that our trunks were put off, we disembarked. Amy Kerr, my beloved friend of public school teaching days, was there to meet us. First, we passed our baggage through customs; then in a motor we located Amy's younger sister Mrs. Pogue (both newspaper women) and we all went to the Vancouver Hotel "Annex" for dinner, which, against my protests, Alice insisted should be with her compliments.



Note added 30 years later (1952). I still receive receive Christmas and Birthday greetings from my dear friends Amy and Alice, as well as a younger brother and sister, all living together in Vancouver.

Then we went to the C.P.R. station. Our baggage had arrived from the steamer dock and so I bought three single tickets for Toronto, \$276.75 in all; and a section in the sleeping car, \$47.05; and checked our baggage to our destination.

We drew out of the station at 8.15, beginning the last stretch of our long journey.

### Mountain and Prairie

Passing through the mountains on Sunday, Nov. 19, we found that much snow had already fallen, and more fell in the afternoon under an overcast sky. We thought the scenery was magnificent. At Glacier (420 miles from Vancouver) it required 17 minutes to go through a tunnel which reduced the gradient and also the mileage. It was not built when first I passed this way (1907). At Field (505 mi.) in the evening, the station seemed crowded up close to the mountains and we felt overwhelmed by their greatness, although we could see them only in bare outline. Banff (560 mi.) was reached at 10.30 p.m.

For much of the time I sat at the rear of the observation car, and I was proud of the C.P. Railway.

At Medicine Hat (817 mi.) at 7.30 a.m. Monday, the Natural gas was burning in the streets.

As we passed swiftly along over the prairies I noted that the settlements were mostly of a single pattern, -- usually seven elevators near the station, occasionally varying by one or two. Many of these



in Saskatchewan were busy, the farmers drawing their grain in their big wagon-boxes and storing it in the elevator. Many box-cars were on the tracks waiting to carry the grain to the big centres or to deep-water docks for shipment overseas.

On this day the sun set soon after 4.10 over the prairies and then there was a glorious sky, full of golden yellow and brightest crimson.

We reached Winnipeg (1473 mi) at 8 a.m. Tuesday, Nov. 21, and left an hour later. There was no snow there. Our train, containing 14 cars, was exceptionally long and heavy but it kept strictly on time.

#### Farm Land, Rocks and Lakes

Going east from Winnipeg we first passed over prairie land, but soon we came to rocky country with trees and lakes.

Much of the road was double track and I noticed that our train was running on the left-hand track. I remembered that years before this I had the idea that the train used the left-hand track so that the engineer, being on the right-hand side, could observe the track better. But I asked the trainman why our eastbound train was using the left-hand track and he said it was on account of the grades being better. At some places the tracks diverged from each other and were on different levels.

Every little while we would move along in a channel ploughed out of the solid rock, and we passed beside lakes and rivers innumerable; and there were long freight trains, going west for grain, going east with it.

At Dryden (1682 mi., 3.25 p.m.) named after a former Minister



of Agriculture for Ontario when I was a college student. I remember hearing him make a speech in the old Parliament Buildings on Front St., in opposition to extending the franchise to women. At this place I saw three wireless masts, and at several places I saw people skating.

We reached Fort William (1892 mi.) at 9.25 p.m. and I sent a telegram to my daughter at home.

White River, Sudbury, Home

I had hoped to see White River (2144 mi.), the famous place which reports low temperatures, but we passed it at 8.05 a.m. which was before I was up.

Sudbury (2444 mi.), where we changed trains, was reached at 7 p.m. We left some parcels at the station, went up town and had dinner at the New American Cafe, which was managed by Chinamen. My wife took chicken but daughter and I had venison steak -- a great treat.

We boarded the sleeper and at 10 o'clock the train started southward. At 8.10 a.m., Thursday, Nov. 23, we reached Toronto (2704 mi.) and were met by relatives. We took a taxi and soon were home.

Within an hour Bessie and I were at the University where we had a grand welcome. The College session had begun almost eight weeks before this and the rules regarding the absence of students, especially students of medicine, from lectures and laboratory work were very strict, but the matter was not referred to. Daughter was given her card of admission without a question. As to my work, my assistant had started the classes, ready for me to take over.

(Nov. 13, 1951)







Chap. XXI. A Visit to Mediterranean Countries  
and Great Britain, 1925

(1) Through Spain and to Alexandria

A Long-considered Trip

My intimate friend William Pakenham, Dean of the Ontario College of Education, and I had often talked of an extended trip abroad and we decided that 1925 was a suitable year to undertake it.

The discovery of the Tomb of Tut-ankh-Amen in Egypt had focussed the attention of the whole world, and many of the objects found in it had been removed to the Cairo Museum, although some still remained underground. Arrangements had been made to hold an International Geographical Congress in Cairo in April 1925, to celebrate the Fiftieth Anniversary of the founding of the Royal Geographical Society of Egypt; and by becoming delegates to this Congress we should have favourable occasions to see some of the extraordinary features of this ancient and remarkable land.

In England there was to be a meeting of the International Astronomical Union and also the celebration of the 250 th Anniversary of the founding of the Royal Observatory at Greenwich.

In addition to the above special attractions there are in the various countries of Europe at all times interesting things to see and important facts to learn. We should be able to enjoy a full summer of entertainment and improvement.

Our Itinerary

We proposed to sail from New York on March 2 and reach Vigo, Spain, March 13 and Madrid next day; to leave Spain (Barcelona)



March 22, and in Marseilles next day take ship for Alexandria, arriving there March 28; to go on to Cairo March 31 and remain until April 13; to reach Luxor April 14 and leave on the 17th, returning to Cairo and thence on to Jerusalem, arriving April 20; to leave on April 27 for Tiberias, going thence to Damascus and Beyrout in Syria; then to visit islands in the Aegean Sea and to go on to Smyrna in Turkey; then on to Constantinople, to Athens, to Italy, to Marseilles and Provence, to Paris, and finally to England and Scotland for two months. We should leave Glasgow on September 12 and reach home on September 20, after an absence of nearly seven months.

By the French Line to Spain

On the evening of Saturday, February 28, 1925, we gathered at the Union Station. My wife Jean and I were driven there by Dr. R.K. Young, who had joined the staff of the Department of Astronomy of the University of Toronto in the previous October; while Will and Laura Pakenham were conveyed thither by Professor Lang, their neighbor across the street. A host of friends had come to bid us a safe voyage a safe return.

We left promptly at 5.40 p.m., and reached the Pennsylvania Station in New York at 8.20 next morning. We went to the near-by Pennsylvania Hotel, then advertised "2000 rooms, 2200 baths, the biggest in the world".

The weather was unpleasant - cool and showery - but W. and I walked over to Pier 74 whence we were to sail on the morrow, and then went by "Elevated" to Battery Park to visit the Aquarium.

In the evening, between showers, we walked over to Fifth Avenue, and while returning along 36 th Street we observed smoke coming out



of a 7-story building and were interested to see the firemen rush to the scene and climb up and put out the fire. Most of the buildings on 36 th Street I thought were devoted to ladies' hats!

On Monday morning, in order to make no mistake about our tickets and permits for sailing, we called up the head office of the French Line on State St. and were advised to go to a U.S. Customs office near 14 th Street. We found one on Christopher St., only to be told we must go to the Battery. Indeed we had been told this by our travel agent in Torónto. Other experiences we had with French steamship lines made us very critical of them.

With all haste we went to the Battery, completed our business, returned to the hotel, put our luggage in two taxis and were driven over to the Pier. A freight train was blocking the street but we finally got there. Our papers were at once passed, and the C.G.T. agent also gave us our M.M. (Messageries Maritimes) tickets to sail from Marseilles when should get there. He was suave and agreeable, and we lost no time in going aboard. Twenty minutes later we left the dock.

Two tags pulled the ship round and out into the channel and then she went under her own steam.

#### On the Roussillon

The ship was of medium size and rather slow speed but it was well kept. The cabins were reasonably good and the saloon, writing room, music room and smoking room were all clean and attractive. The meals were good but served very deliverately as is the French fashion.



The voyage however was not very enjoyable on account of overcast sky, persistent wind and showers and lack of heat in the ship.

On January 24 there had been an eclipse of the sun visible as total in Toronto and other parts of southern Ontario. The University sent an expedition to observe it at a hamlet south of Hamilton. The weather was cold and the preparations involved much exposure, and as a result I suffered an attack of laryngitis which had not entirely left me. I had frequent attacks of coughing.

As a precaution our ladies took a dose of 'chlorestine' but that did not prevent them from being indisposed on the first afternoon as the ship pitched badly with a following wind. They had difficulty in imparting their wishes to the steward. He who regularly attended to us spoke Spanish and French but little English. So one who could speak English (in a way) was brought in to interpret. Jean wanted toast, not fresh bread. Said he, "Toast in the morning!" Result: they went without anything.

Occasionally we had hours of sunshine, but overcast sky, head wind and slow travel - about 270 mi. in 24 hours - were what we experienced.

However at 8 o'clock on Friday morning, March 13, we reached the port of Vigo, a city of over 50,000 population on the northwest corner of Spain. A German ship "Bayern" and another French ship were in port. We soon dropped anchor and a dozen of us went ashore in a gasoline launch; and our luggage was taken to the Continental Hotel.



Then we went out into the city, which we thought very quaint and picturesque. There were donkeys with burdens of all sort, oxen drawing wagons, women with baskets or other things on their heads, street-cars and automobiles.

### On to Madrid

We had lunch at the hotel, with an abundance of sea-food, and then we went in the bus to the railway station. The hotel porter bought our tickets, each 105 pesetas (1 p. = 15¢) and another porter carried our bags aboard. On the same train were Mr. and Mrs. Cooley of Brookline and Stevens, a 26-year-old graduate of Dartmouth. Our party received a fine First Class compartment; theirs was not quite so good.

The distance from Vigo to Madrid in a direct line is about 275 miles, but by the route we followed it was approximately 440 miles. First we went 20 miles south to the Minho River which there is the boundary between Spain and Portugal, then north-east to Monforte (90 mi from Vigo) where we took on additional cars from Corunna in the north, then east to Laon (215 mi.), then south-east to Valladolid (312 mi.), then south-east to Segovia (382 mi.) and 58 miles on to Madrid (440 miles in all).

As we left Vigo the engine was small with a "childish" whistle, and there were only three cars, each with four wheels. Our car was the only one with First Class accommodation.

At each station there were two "civil guards", to see that no lawlessness occurred. The country along the Minho River was mountainous, with some snow-covered peaks. The country was poor but



intensively cultivated. The sides of the hills were terraced for grape-vines which for the next year's crop had been cut right back to the old stock. The stones were picked from the land and built into line-fences and walls on the terraces to hold back the soil.

We were told that many people were leaving Spain for Cuba on account of the political condition, as the Military Dictator had not succeeded in bringing peace and order to the country. There was a constant fear of a political earthquake.

On the train we met a John James of Vigo who had lived in Spain 21 years. He was a big fat auto-dealer. He took some interest in us as his sister (Mrs. Morgan) had died in Toronto two years earlier. He gave us much advice and information, and assisted us in getting a lunch at Monforte where at 5.30 we stopped for 30 min. to take on more cars from the north. Each of us got a paper bag full of food and a big bottle of wine, all for 2½ pesetas. There was lots left over.

We had expected to take a sleeping-car at Laon at midnight, but learned that the price was excessive, and so decided to rest as well as we could in our compartment. It was fairly satisfactory.

Additional cars were added to the train at several junction points, and two armed guards came aboard, presumably to prevent any cases of robbery, of which a good deal was reported in the north part of the country.

At one station I saw a woman carrying an empty bottle on her head. She certainly was upright in her deportment! At another there was a pile of lumber fifty feet high, from which I concluded there



were no strong winds there.

Next morning we wakened as the sun was rising in the east over the treeless plains. Indeed we seemed to see hardly an acre of fertile land. Rocks after rocks, and a great lack of forests - they had been ruthlessly destroyed centuries ago. It was said that the trees sheltered the birds which stole the fruit and so they were cut down.

At Segovia there were snow-covered hills again and an extra engine was attached. Before our journey's end there were some finer houses, and at last at 10.15 a.m. we drew up to the imposing Madrid station.

Our bags having been carried out, Stevens, who had learned a little Spanish, bargained for a "family coach" and we seven all got in, with our luggage on top, and drove to Hotel Barazal on Gran Via, which had been recommended by James. It was a tall seven-storey block with shops on the ground floor. The rooms were clean and reasonable, 35 pesetas for two of us, including meals, which were ample although not all the dishes were to our taste.

#### Toledo and El Escorial

The next day (Sunday) was sunny and not too cool, and the party, omitting my wife and myself, made an excursion to Toledo, 35 miles to the south, in a Fiat car, with a driver and a guide. As my cough was annoying, we decided to stay at home.

We walked along Gran Via and admired the store fronts and general style of architecture. The seven stories of cut and carved stone, with marble and bronze decorations, were quite beyond any row of buildings



in Toronto. Many people were on parade, the women usually without hats and the children with bare legs. There were also motors of many kinds, among them being a Chrysler-six and a "Good Maxwell".

On Monday at 9.30 a.m. our group of seven, together with an Englishman from Liverpool, and a guide, left in a charabanc for El Escorial, which is 31 miles north-west of Madrid in wild and barren country. As usual, the country near Madrid had some trees, but generally it was bare of trees or fences, except odd stone ones.

The monastery El Escorial is one of the most remarkable buildings in the world. It comprises a convent, a church, a palace and a mausoleum. It brought us to think in a more personal way of Philip II (1556-1598). After a victory over the French at St. Quentin in 1557 he made a vow to erect such a building. Its construction required 24 years. Right before us in the Mausoleum we saw the carved marble tombs of this Philip and the other rulers of Spain, the last being that of Alphonso XII, who died in 1885. We saw the chair in which Philip was carried from Madrid (in 7 days) when he was ill, and the chamber in which he died. I was never so impressed with the meaning of "departed greatness".

On our return we had dinner at 8.30, and after it walked about the streets to get a view of Madrid at night, but as the theatres went in at 10 o'clock we decided not to attend.

#### Houses of Parliament, Prado, Peluquiera

We visited the Houses of Parliament, which were not in the same class as ours at Ottawa, and hardly worthy of a great nation; and we entered an old church with wonderful carvings, but dark and dismal. We went to the Prado twice where we saw many famous paintings



by Velasquez, Murillo and Goya.

In order to rid myself of my laryngitis I had delayed having my hair cut, and after lunch on our last day in Madrid W. and I started out to locate a barber shop - a peluquiera. We found one but it was closed until 4.30. So we rested a while, and later in the afternoon called again. It was open and had many patrons. However my turn came and I took my place in the simple cane - seated armchair - nothing of the elaborate American type. Having finished, I tried to find out the cost, but I could not make out what the barber said. After stammering about for a minute or more one of the other patrons called out in plain English, "seventy-five centesimos", which is three-quarters of a peseta or 11 cents.

English people seemed to be everywhere and quite at home in Spain. Before we should leave Madrid we went to the Garibay Tea Rooms, next to Cook's travel office on Gran Via, and amidst other English people had fried muffins and cakes and real tea and hot water!

#### To Cordova and Seville

We did not wish to leave Spain without a brief visit to the old province of Andalusia in the south, so we bought tickets for Cordova (275 mi.) and Seville (80 mi. beyond) - both on the Guadalquivir River. We should then retrace our steps to Madrid (355 mi.) and go on at once to Barcelona (385 mi.) and Marseilles (300 mi. farther).

At 7.20 p.m. (Tues. Mar 17) we left Hotel Barazal per Hotel



Americans bus and an hour later started south in our comfortable sleeping-car. We arrived in Cordova at 6.a.m., as the sun was reddening the sky in the east. The bus took us to the Hotel Regina and we engaged the porter on it, who spoke English, to act as our guide for half a day, for 10 pesetas.

After a plain breakfast, including green-fig jam, we started out at 8.30. Many of the streets were narrow and crooked and the houses were ordinary in appearance. But if one looked through the grating in the front door one often saw a very attractive patio within, tastily tiled and decorated with beds of flowers. During the hot mid-day hours canvas is drawn over the patio; also, the street being narrow, the sun does not unduly heat up the pavement or the walls of the house. When the hot time of the day has passed the curtain is drawn back and the house is cool. But in the course of the summer the temperature rises to 115 in the shade and there is a period of rest in the afternoon.

The <sup>o</sup>Masque, or more properly Cathedral, is remarkable. It is declared to be the grandest and noblest creation of Moorish architecture in Spain. It was founded on the site of a Roman temple by a Moorish caliph in 785, and with succeeding rulers it continued to take extraordinary features. Within its walls is a 'forest' of 850 pillars, many being of beautifully-coloured materials, all being joined by horse-shoe shaped Moorish arches. Cordova was conquered by the Christians in 1236. During part of the time we were in the Cathedral a service was being conducted which, on the face of it,



showed that the Christian religion had triumphed. The magnificent columns and the mihrabs, or prayer recesses, are the two outstanding features of the structure, but the carving in solid mahogany of the choir stalls was the finest I have seen. Indeed everywhere there was an exhibition of wonderful workmanship.

Near the Cathedral was a Moorish bridge over the Guadalquivir River. It contained sixteen arches which rested on Roman foundations, and from it several old Moorish mills could be seen in the river.

We left Cordova in the evening and arrived at Seville (80 mi.) at 9.40. As usual, we took the bus to Hotel Inglaterra, where we found a host of tourists in a queue in the office before us. I wondered if we should have to wait until they had all been served, but in a few minutes I heard my name called and going forward found that rooms had been reserved for us.

Seville had a pleasing appearance. Its population was 148,000, just twice that of Cordova. It also had a great cathedral which was described as "one of the grandest and most sumptuous Gothic churches in the whole of Christendom". It occupies the site of a Moorish mosque founded in 1171. The church was begun in 1402 and was almost complete in 1506. It is on record that its roof has collapsed three times, the last time in 1888.

Quite near the cathedral is the famous Giralda tower, the conspicuous landmark of the city. At the height of 305 feet a weather-vane is mounted, consisting of a bronze figure representing Faith.

The palms and orange trees and the flowers were very attractive, and the Royal Gardens, the old Roman wall with its squat round tower and the S. Fernando Park were very pleasing. Both in Cordova and



Seville the donkey was a useful animal. By means of big jugs slung over its back it carried round the milk for the citizens, and oranges in its panniers were common on the streets. I noted many horse-carriages-victorias or landaus-waiting to convey visitors about the city.

### Bound for Barcelona

We left Seville for Madrid (355 mi.) at 8.10 p.m. in the comfortable sleeping-car. The southern country lacked trees but it was more fertile than what we had seen in the north. We reached Madrid at 9 o'clock next morning and left again at 9.30 for Barcelona (385 mi.) The engines which drew us from Seville to Barcelona were big ones, made by the American Locomotive Works, and the First class coaches were in the same class as in our American trains, except in toilet accommodation which was abominable.

There was much mountainous country and I was impressed with the skilful irrigation schemes. The fields were terraced to be on the level. There were few trees except olive trees and the country was almost bare of shade, although we did see some almond blossoms both at Seville and on this journey. We also saw sheep pastured on the side of the railway, always with one or two people in charge.

We were surprised to purchase in Barcelona, and later in Egypt, the Saturday Evening Post and Ladies Home Journal on the very date of publication.

Barcelona is a big place, with a population of a million or more. Moreover we seemed to recognize a different spirit there from



that in Seville and the south. Life in Catalonia was not the same as in Andalusia. The chief streets were very wide, and at the two sides were lanes for automobiles and street-cars while the people walked along the middle. Rambleas and Colon were two noted streets and at their end, near the busy harbour, was a fine column bearing a statue of Columbus. The public Park was well cared for and there were many palms and plane trees about. There were several big moving-picture theatres, the Coliseum being one of them. At 6 o'clock we went to it and saw the film, "The miracle of the wolves", which was gruesome in places. After it came the long-drawn-out dinner at the hotel.

#### On to Marseilles

Next morning was Sunday, and I noted that the men were cleaning the streets while people with furs and flesh-coloured stockings paraded. Soon after 9 o'clock the Grand Hotel bus took us to the Estacion del Francia, and after a tussle with the persistent porters we found ourselves in a comfortable compartment bound for Marseilles, 300 miles away.

For much of the way the country was pleasant, with green earth and trees. The terracing for irrigation, as usual, drew our admiration. As we approached the border of France the track ran along the Mediterranean shore and the successive bays, with fishermen's huts and other people's villas, were picturesque. In this part of our journey many hills were covered with vines and there was an appearance of considerable prosperity. At Port Bou, the last stop in Spain, an officer came on board to change our money. He gave me 54 francs for



20 pesetas, or the franc was equal to 5.5 cents.

At Cerbère we passed customs and entered a French train. When we reached Cette our tickets were punched again. Dinner was served in a restaurant car at 7 o'clock when near Montpellier. It was not quite so lavish as in Spain but cooked more to our taste. Then at 8.55, at Tarascon, we changed to the train for Marseilles.

This city we reached at 2400 (midnight). We asked a porter to go to the near-by Hotel Terminus, which is conducted by the PLM (Paris, Lyons and Mediterranean Ry.), and after some delay he reported that it was "complete". Then we went in a cab to Hotel Splendide, which also was full. At their suggestion we drove to Hotel de Bordeaux. The proprietor was a little suspicious and slow to take us in, but when we told him the Splendide had directed us to him he lost all hesitation and was very agreeable. We decided that fourteen hours was too long for a railway journey without sleeping accommodation.

Immediately after petit dejeuner next morning (Mon. Mar. 23) we set out, in the rain, for the Messageries Maritimes offices on Place Sadi Carnot. We learned that we could not secure First Class accommodation, which we had ordered in New York. After wasting considerable time, owing to their lack of system and their making several mistakes, W. and I were refunded one half of our passage money, Marseilles to Alexandria, on account of our membership in the Congress to be held in Cairo, and we received our actual second class tickets. The Company refused to make a similar refund for our wives until we should present documents proving their membership in the Congress. Two months later when we were in Marseilles again



we had the proof, but they would not make any adjustment. We accused them of dishonorable conduct.

We quickly returned to our hotel, gathered our bags together, drove back to the dock and took possession of cabins 207 and 215, - with which we had no fault to find. The ship, I think was called Cleopatra. It had belonged to the North German Lloyd, when it was called Jobin. It was built in 1913.

#### Marseilles to Alexandria

Dejeuner was at 11.30, at the ringing of a hand-bell. At it we found a goodly number of English-speaking people about us. Across the table were two Germans.

It was raining and cold when the ship moved out and started eastward along the shore, which it followed until darkness fell, which was early.

The ship was full of passengers, many of them being Jews bound for Jerusalem, to be present at the opening of the new University on May 1. My neighbor at lunch was from Johannesburg, S.A. He was an Oxford man, he told me. He also said there were on board Jewish representatives from the various nations of Europe.

On coming up from breakfast next morning (Tue. Mar. 24) we thought we were opposite Elba. With field-glasses we could see the wireless telegraph station on top and villages along the shore.

There were all sorts of people on the ship. On the second afternoon three artists sketched the face of one of our Jewish friends who sat on the opposite side of our table, two in oils, one with charcoal.



I noted, too, that on the deck there were 12 horses, 2 geese, 2 turkeys and a number of fowl. The crowing of the cocks in the morning was familiar to our ears.

We were off Stromboli at 11 o'clock (Wed. Mar. 25) and entered the strait of Messina about 2 p.m. The scenery was beautiful on both sides. Wireless telegraph masts were seen on the Sicilian side. The hills were cultivated to the very top in many places and there were various towns along the coast. Shortly after this we saw a British passenger ship, Caledonia, and a French ship, Amiral Pierre, as well as others - indeed more about here than all together heretofore. But soon we drew away from the shore and got into the larger water and at 10 p.m. the ship was pitching vigorously in the wind.

My neighbor at table told me that in the Third Class there was a Hebrew named Tchernowski, a native Russian but then living in Berlin, who had translated into Hebrew verse Hiawatha, Kalevala, Iliad, Odyssey (seven years spent on these two). I learned also that a man named Schnur, across the table, originally a Russian but then living in Paris, could talk French, English German very freely, also Yiddish and I don't know what else. I thought he was well satisfied with himself.

There were ten or twelve English people on the way to attend the Geographical Congress and indeed they took a leading part in it.

The man second from me at table was a real reformer. With some people it is in their blood! He inspected the ship and protested strongly against the condition of the Fourth Class. He said there were about 400 men, women and children in bunks one above another



in a big room with no reasonable conveniences. They were students, English and continental, many of them well brought up, (who had been much deceived as to the accommodation), and some central European people who have to travel as cheaply as possible; also a nondescript lot of foreigners bound for Egypt or Palestine. He said the twelve horses on deck were cared for like men, but these humans were treated like animals. Some of them transferred to third and second class, but others did not change, being loyal to their comrades. He said he would write to the newspapers about the disgraceful condition on the ship. It was not so objectionable as long as all were well, but when sickness came the condition was lamentable.

#### Corrugate your Facts

In our company there was an old man with a bald head and a pipe, also with a decided cockney accent and yet was French. He got in conversation with my companion Will on our last day on the ship.

First, they talked about birds. W. spoke about the laws of their migration. Our friend was not aware that this subject had been studied. W. told him of Jack Miner tagging the Canada geese.

"That's the way", said he, "first corrugate your facts". He asked, "Where do you come from - America?"

"Canada".

"How nice!"

He then asked if he was from Upper Canada or Lower Canada.

Said my friend, "Upper Canada".

"That's where they speak French".

He also referred to Canada being made into one province through



Lord Durham's advice. Also, he asked what Canada did in the War, if we had much debt and if England was paying it!

(We are due to arrive in Alexandria at 6 a.m. to-morrow  
Saturday, March 28, 1925)

Jan. 21, 1952



Ch. XXI A Visit to Mediterranean Countries & Great Britain, 1925(2) Egypt

Our approach to Alexandria quickened our interest in that ancient name. When, as a lad, I read about Alexander the Great and how he conquered the world, it seemed to me largely tradition, almost a fairy story; but here we were at the city which this famous warrior definitely founded in 331 B.C., and the history of which could be traced from that ancient date. After periods of great prosperity followed by disasters and calamities, it was still an important centre where half a million people made their livelihood.

We also recalled that Euclid lived in Alexandria in 300 B.C. Hypatia in 400 A.D., and that Julius Caesar and Mark Antony and the pleasure-loving Cleopatra wasted here many years of their lives (47-30 B.C.).

Ancient and Modern

We entered the harbour soon after 6 o'clock Saturday morning March 28, but visits by customs and passport officers delayed our going ashore until 9 o'clock.

Upon the ship there came the Comité de Logement and we found that our party of four had been billeted to the Windsor Hotel. We tied tags to our luggage, signed a customs declaration, and got a Cook's porter to take charge of the several pieces. Then we were put in a motor-car and driven to the hotel, free of all expense. This was done by the Alexandrian Committee.

Our rooms were on the third floor, and the windows looked out to the north over the fine road along the ocean shore. We were to spend three days in Alexandria.



Next we went to the important Greco-Roman Museum where we registered, and we were given three publications - (1) a well-produced guide to the Ancient and Modern Town and to its Museum; (2) a guide to the Collection of Mussulman Art; and (3) an 84-page pamphlet entitled "Canopus, Menouthis, and Aboukir", published by the Alexandrian Archaeological Society. The author of this pamphlet was Rev. J. Faivre, S.J., and it was translated into English by Alexander Granville, C.M.G., President of the Archaeological Society.

#### Visit to Canopus and Aboukir

At 3.30 p.m. we assembled at the Palais Municipal (City Hall) and were driven by motor to the site of old Canopus, about twelve miles east along the shore, where an address was given by Breccia, the director of the Museum. Scattered about were pieces of broken pillars and of other cut stones, large and small. That was all that remained! The ruins had been robbed to secure building stones. References to Canopus go back as far as the 2nd century or even earlier. Then we went on two miles to Abou-Kir where we saw the place where Nelson defeated the French on Aug. 1, 1798. It was a most interesting old place, and the magic of Nelson's name seemed to linger there. There was a big crowd and here we had tea.

It seemed clear to me that the British controlled all the sea-front in the neighbourhood of Abou-Kir and much of the shore almost to Alexandria. There were extensive R.A.F. buildings and fields. Further, I understood there was a British garrison in Alexandria. This realization of British strength in Egypt gave me a feeling of stability and justice.



It was an interesting and pleasant trip. We were brought back to our hotel in a Fiat. My friend questioned the driver a little on the way. He did not know much English, but he expressed resentment at the English occupation.

#### An Eastern Sunday

Sunday was a fine day; blue water and blue sky. Men were working on the building opposite to our hotel, quite the same as the day before.

At 10 o'clock we gathered at the Palais Municipal and heard two addresses of welcome and an eloquent reply (all in French). The first was by the Governor of Alexandria; the second by the Procureur Général pres les Jurisdictions Mixtes, Mr. F. Van den Bosch; I did not get the name of the third speaker. Then Prof. Breccia conducted the party through the Museum. There were many interesting relics from the Graeco-Roman period, 332 B.C. - 640 A.D., mostly found in the neighbourhood. The new building was opened in 1895, and since then has been greatly enlarged. The Museum has admirably succeeded in attaining the object for which it was founded.

In the afternoon we assembled again at the Palais Municipal and by perhaps fifty motors were conveyed about three miles east to the magnificent 42-acre domain presented by A.J. Antoniadis to the city in 1918. The gardens were wonderful. They were laid out with precision and kept in perfect order. There were palms of various kinds, Moreton Bay figs, tropical shrubs of all sorts, Bougainvillea vines over the villa, pansies, cinerarias, lilies and much other colour. Everything was beautiful and impressive. There were also fine refreshments for the visitors.



At 6.15 p.m. we attended the service in St. Mark's Church, near our hotel. Some thirty men and women were confirmed by Bishop Quinn. I remember that in his address to them he remarked on the respect and influence of the British officers in Egypt, and said it was because they kept their word.

In the daily life of Alexandria I could not but take note of the dirty Arabs, smelly streets, food and fruit exposed for sale, numerous donkeys, many horse-carriages, motors, not-attractive Egyptian police, green fodder for horses, many beggars, red fez's and soiled white gowns on Mussulman shop-men.

#### Pompey's Pillar and the Catacombs

On Monday morning, March 30, W. and I went to the Palais Municipal, as usual, and were driven to Pompey's Pillar which is erected on a little plateau in the south part of the city near the Mahmoudich Canal. This was the site of the ancient Serapeum, or great temple of Serapis, whose worship was introduced by the Ptolemies (c.300 B.C.) Around the Pillar are several sphynxes, one in good condition, and also fragments of ruins. The Pillar was said to be the largest well-preserved relic of antiquity in the city.

Prof. Breccia was there and gave us an address. The monument is composed of red granite from Assuan. The height of the column, including the rectangular pedestal and the Corinthian capital, is 88 ft.; the shaft, 68 ft. high, is about 9 ft. in diameter at the bottom and not quite 8 ft. at the top. The foundation contains several blocks which once belonged to other buildings. On the west side is an inscription in honour of Diocletian, placed there in 292 A.D.



The present name of the pillar is due to the medieval belief that it marked the tomb of Pompey the Great, (B.C. 106-48).

Then we went about half a mile farther south to the Catacombs. This burial ground was not discovered until 1900 and probably dates from the 2nd century A.D. It is believed that its main chambers belonged to an Egyptian nobleman while smaller vaults are of his dependents.

We went down a spiral staircase about fifty feet and then we branched off in different directions through passages in the solid rock. From these passages openings in the rock were made to receive the bodies - in coffins, I suppose. At one place there were three tombs unopened. The carvings on the walls were Egyptian (sacred cow, sun-god, Thoth, & c.), but on the front of the tombs there were Christian symbols. Through the top of one tomb an opening had been made, and an electric light within revealed a mummy in water which had seeped in; and the skull was apart from the body. Some of the lower stories of the catacombs are generally in water. Indeed, the canal is only about 200 yards away.

After this we were taken for a drive, to show us the old part of the city with its narrow and crooked streets. We went past the cotton market, the extensive docks, the Khedivial Palace, Ras et-Tin (King's Palace - and not very attractive); and then along the sea-drive near our hotel to the Royal Institute of Hydrobiology. This had been recently organized to study the products of the sea as is done at our Canadian biological stations at St. Andrew's, N.B., and other places. On the way home we saw an Arab funeral procession with the paid mourners wailing.



### The Suburbs of Alexandria

On our last afternoon (Monday, March 30) we employed a Fiat car to take us on a long excursion. The driver was an Italian but he had been in Alexandria for some years and was married. He spoke Italian, French, English and Arabic.

Our route first was out to the Light House, which on Pharos Island had many changes through the centuries due to the moving sand. Then we went through the native markets, where one could buy chickens, fruit, gold, glassware, and many other things. Next we went eastward about ten miles along the Mahmoudieh Canal to Zaharieh where we crossed the railway and went through Ramleh, where there were some beautiful homes, including that of Allenby and those of well-to-do citizens of Alexandria and Cairo.

I was interested to see that an electric railway ran from Alexandria out to Ramleh and ended at Victoria College, which, founded in 1901 by public subscription in memory of Queen Victoria, was opened in 1909 to provide a liberal education on the lines of the English public schools.

We went through the Nuzha gardens, owned by the city of Alexandria, which adjoin the Antoniades garden and both of which abut on the Canal. We had  $2\frac{1}{2}$  hours of a most interesting drive. The people seemed good-natured and happy and pleased to have their pictures taken.

### To Cairo, Ancient and Modern

Tuesday, March 31, was a fine day, as usual. At 7.30 our luggage was taken to the station by Cook's men, and one hour later we followed



in a single-horse carriage and boarded the special train for Cairo, which was waiting for us. We simply showed our Congress membership cards to get on the train. It was drawn by a big modern engine and made good time. The distance was 130 miles which we travelled in  $3\frac{1}{2}$  miles.

The cars (carriages, perhaps I should say) were II Class and our quartette had a compartment to ourselves. A corridor ran along the side of the car, not through the centre as in America, and there was no door from it into the compartment.

We passed over much fertile land which was being prepared for cotton. There were many Arab mud villages, usually with flat roofs but occasionally with a dome. The fields were ordinarily green but some grain (which I took to be barley) seemed almost ready to cut. Many primitive plows were seen; they were drawn by teams of oxen, water-buffalo, or these mixed. The yoke was about eight feet long, fastened to the end of a long tongue. Many people were in the fields, including, I thought, a good proportion of women, but the men's garb was so 'womanish' that I could not distinguish it at a distance. Usually groves of palms added picturesqueness to the landscape; also camels loaded with green fodder or perhaps with no burden. There were also donkeys with baskets hung over their backs or with a man sitting astride with his feet almost touching the ground. We saw women leading cattle or bearing jars or other burdens on their heads. We passed alongside or over numerous canals, used chiefly for irrigation, but in many cases picturesque boats with tall sails were to be seen on them, carrying freight of various kinds.



### We Reach Cairo

On our arrival in Cairo a Grosvenor House porter took charge of our luggage and we drove in a taxi to the hotel. We were the only delegates to the International Geographical Congress assigned to that hotel. We experienced a certain elation on reaching the famous capital of Egypt, where we expected to remain for two weeks.

The Royal Geographical Society of Egypt had fine premises, in the Public Works Ministry Garden, and in order to celebrate the 50th anniversary of its foundation it had invited the International Geographical Union to convene in Cairo in 1925.

In the afternoon we went to the Congress rooms. We paid the dues of our ladies and received a carefully prepared Handbook full of useful information, and also an envelope containing invitations to the numerous special features of the meeting.

### Busy Opening Day, Wed., April 1.

In the morning W. and I went to the rooms. I asked for Dr. Percy Phillips, an associate at Cambridge, England, of my Toronto friend E.F. Burton. He was now on the staff of the Public Works Division of the Egyptian Government and was in that very building preparing an exhibit for the Congress. He gave us much useful information and advice on clothes to wear, on eating fresh fruit, on hotels and excursions and other matters.

At 4.35 p.m. we left by taxi for the Opera House to attend the formal opening of the Congress. At it King Fouad was present. W. and I sat on the platform, our ladies on the ground floor. There were some Mussulman women present, hidden behind a semi-transparent screen of embroidery. They joked and discussed matters freely.



There were five addresses, in the following order, - French, Italian, English, French, French. The Italian speaker was Vacchelli; the English-speaking person was Prof. Stephenson of New York Hispano-American Society, "representing the Western World." We thought it an odd choice. The Italian spoke too long; the American, ditto, but not so bad.

It was a picturesque sight. Many wore the red fez, but I saw a very dark green one, and there were quite a number of turbans, mostly white. On the platform only a few wore the fez. The meeting began promptly at 5 and was through at 5.55. We walked home along Kasr en-Nil street.

#### In the King's Palace

After dinner we got ready for the reception at the Abdin Palace. We were begged "de venir passer la soiree au Palais d'Abdine . . . à 10 heures p.m." We left in a taxi at 9.50 and soon arrived. Putting aside our wraps, we walked between lines of Egyptian soldiers up the fine marble staircase into a large room. Only a limited number were presented to the King. Then we went into a big room where there was a stage and perhaps 250 chairs, and listened to a concert of singing, dancing and instrumental playing. Every item was of the highest quality. Also, there was a great exhibition of men's decorations and ladies' gowns.

The concert over (12.05), we went into the refreshment room. I never saw so much substantial food on such an occasion. Roast turkey, bread rolls, meats, as well as lighter refreshment. One reason, I



believe, for the abundance of food was that at this time we were in the month of Ramadan, during which the faithful Moslem must eat no food between daybreak and nightfall. After the redeption it was midnight when the hungry person could satisfy himself with the food for which he longed. There was also plenty to drink. I had some orangeade and some other stuff which our ladies said had considerable alcohol content, but it did not bother me.

With the help of a mounted policeman we managed to call a two-horse carriage, but the driver was the stupidest yet. The policeman tried to tell him where Kasr en-Nil street was - a main street only two or three blocks away - but he could not comprehend. However at last we got going and we stopped him when we reached the Grovenor House.

#### Congress Sessions and Extraneous Attractions

The regular meetings of the Congress were ordinarily held in the mornings and my friend and I usually attended them, but not to our great advantage. The papers presented were ordinarily in French but sometimes in Italian or English, and we had difficulty in following them.

But there were numerous other attractions. On every hand there were strange things to see. Further, it is well known that at a convention one very often gains more from meeting the people and from odd discussions than in listening to the 'set' addresses on the programme. Unfortunately my laryngitis had not entirely left me and I had to omit some of the entertainment provided.

One of the greatest attractions in Cairo is its Museum and to it we went on the afternoon of April 2. The English-speaking people were



conducted by a Mr. Quibell. Spread over a considerable portion of the floor space were the articles which had been brought from the tomb of Tut-ankh-Amon. We had seen numerous photographs of these things, but here were the objects themselves - the King's Golden throne with the back showing the Queen anointing the King, the several couches, the chariots, the King's sceptre, alabaster vases, a funerary bouquet from 1300 B.C., and many other things. These ancient Egyptians seemed very close to us!

But, taking our attention away from King Tut, Mr. Quibell showed us the treasures of the Jewel Room, among them some beautiful ornaments of solid gold; and he also explained the significance of the many simple articles assembled in another room to illustrate the manner of the daily life of the ancient people generally.

#### Golden Jubilee

On Friday, April 3, was the celebration of the 50th Anniversary of the founding of the Royal Geographical Society of Egypt. On the tickets for the occasion the time was given as 5 o'clock but the general programme said four. We followed the former and as a consequence we were late. The proceedings were mostly in French. Among the features of the meeting was the presentation by the Geographical Society of Philadelphia of the Elisha Kent Kane medal to Ahmed Hassanein Bey, explorer of Libya. This gentleman had been educated at the Royal Cairo Law School and Balliol College, Oxford, and responded in good Oxford English. He had been 1st Secretary of the Washington Legation in 1923 and in 1925 was 2nd Chamberlain to the king.



In the evening we went to a reception tendered by Adly Yeghen Pasha, President of the Committee of Organization, at the Semiramis Hotel, a beautiful place on the bank of the river. It was intended to hold it outside, that it should be a "Fete de nuit sur le Nil", and there were lanterns and other decorations on a ship on the Nile as well as the presence of a good band. But the weather was unpleasantly cool. There was some dancing in one of the big rooms, and pleasant conversation and refreshments.

I met an English geologist named Matley who looked much like our Canadian geologist A.P. Coleman. He had attended the British Association meeting at Toronto in 1924; and had gone across to the Pacific and down to Fiji, Indian and other places and was on "the home stretch" to England now. The refreshments were the most elaborate I ever saw. On a slender framework of ice, decorated with flowers, there were cakes and confections in marvellous forms. On the long table were roast turkey, a whole roast lamb, a big salmon, cakes of various shapes and all manner of drinks. We got home at midnight.

#### Anxiety about later Travel

During our first days in Cairo we wished to complete our arrangements for sailing from Beyrout in Syria about May 1. We visited the office of the Messageries Maritimes several times and sent several telegrams of inquiry. At last on the morning of Saturday, Apr. 4, we were informed that on the "M.M." ship sailing from Beyrout on May 1 there were no first or second class cabins available. We then made inquiry at the Lloyd-Trestino office and were able to secure two



cabins on a ship sailing on May 2 from Bayrout for Brindisi. We were promised a reduction of 15% on the four tickets, the total cost being £95 stg. This was satisfactory to us.

### The Pyramids of Gizeh

The Pyramids are among the greatest attractions in Egypt. The very shape and appearance of the object themselves are remarkable; but in connection with the Great Pyramid there are some astronomical questions which are important and interesting. Further, many persons have been convinced that measurements on the Great Pyramid have revealed the divine plan of the ages as contained in the Holy Scriptures. I could never accept the validity of this conclusions.

But from the 2nd century the Pyramids of Egypt have been named first in a list of the seven wonders of the world, and we were keen to see the greatest of them all. So at 2.30 p.m. on Saturday we took the tramway at Place Ismailia and in about forty minutes we arrived at the Pyramid station. We walked up to the top of the hill, around the north and east sides of the Great Pyramid, and then down to the Sphinx. I got some negatives with my camera, including one of myself, with two others of my party, standing beside the few great casing-stones which are still in place; also, some pictures of our ladies on a camel beside the sphinx.

Then we went up to have tea offered by S.M. le Roi which was served under a canopy at the Khedivial Kiosk (king's pavilion) at the north-east corner of the Great Pyramid, overlooking the valley to the east. As usual there were elaborate refreshments, but no



turkey! There was tea, lemonade, ice-cream and cake in profusion and it was served in the pleasant open air sunshine. It was very enjoyable. Then we walked down off the plateau on which the three big pyramids are located to Mena House, just to the east, where we boarded the tram. We got home about 7 o'clock.

We had an invitation to a concert of Oriental music in the evening, but decided not to attend.

#### A strange Sunday, April 5

Within a small area about twenty miles south of Cairo there are some of the most wonderful monuments of ancient Egypt, and an excursion had been arranged to give the delegates to the Congress an opportunity to see them.

Accordingly at 8.45 a.m. we assembled at the Anglo American Navigation. Co's dock on the Nile, quite near the Semiramis Hotel, and went aboard Cook's ship Britannia for a trip up the river. The capacity of the ship was said to be 200 but I am sure 250 were crowded upon it.

We slowly steamed up the river and tied up at the village of Bedraschein on the west bank. On the way lunch was served, under great difficulties on account of the crowded ship.

We aimed chiefly to visit Memphis and the 'step' pyramid of Sakkara. To get to them we went first north and then west, the total distance from the river being seven miles. There were three separate means of transport, (1) by sant-cart having wide metal rims but no springs, (2) by camel, but largely (3) by riding a donkey. Each donkey had a driver, of course, and also a name. Mine was called "Yankee-doodle". These animals were not very dignified nor comfortable,



but we had to take what we could get. My driver was anxious to be taken to America to be my servant!

First, we came to the site of Memphis, believed to have been one of the most famous and largest capitals of antiquity; now it has almost disappeared, even its precise location being in doubt. Near here was a wonderful grove of palm trees and in it a colossal granite statue of Ramses II (c.1292-1225 B.C.), lying prostrate on his back, 26 ft. long, with his crown,  $6\frac{1}{2}$  ft. long, on the ground near by. Not far away is a gigantic sphynx, made of alabaster, 26 ft. long, 14 ft. high and weighing 80 tons. While on our way over the sandy plain my party of four got separated but came together again while examining these almost unbelievable relics of early greatness.

Then on a little farther we came to the 'step' pyramid of Sakkara, declared to be one of the oldest stone constructions which have come down to our time. It was the tomb of King Zoser of the 3rd Dynasty (2980-2900 B.C.).

Not far away we visited Mariette's House. Auguste Mariette for many years was director of official excavations in Egypt. A few hundred yards to the west of the house is the Serapeum, discovered by Mariette in 1851, wherein enbalmed sacred bulls were buried in great rock tombs.

The private tomb of Ti, a high court official and landowner of the 5th Dynasty (2750-2625 B.C.), with its quite fresh mural decorations, has been well excavated and was extremely interesting. Before us was a pictorial record of the way the people lived at that ancient time.



We all rode back as we had come; we left Bedrashein by ship at 4.45, and at 6.15 landed at Old Cairo dock. The Arab sailors plunged into the water and carried the lines ashore and also helped to put out the gang plank.

It was an unusual experience but next day we had recovered from the exhaustion.

#### Friends from Home; Shepheard's Hotel

When one while travelling in a distant land sees a friendly face from home he feels peculiar pleasure. On Monday morning while listening to a paper at the Congress a lady entered the room, walked over and sat down beside me. I was surprised to see one of my earliest students, Miss L.D. Cummings, B.A., '95. She was a distinguished student in the M. and P. course, and had been Professor of Mathematics at Vassar College at Poughkeepsie, N.Y. for many years. She was travelling with Mrs. George Dickson, whose husband had been principal of the Hamilton Collegiate Institute and later of Upper Canada College. Mrs. Dickson had organized, and conducted for some years St. Margaret's (Ladies) College in Toronto. The two ladies had come from New York on the cruise-ship Adriatic, which they had just left, and they were staying at the historic Shepheard's Hotel. To finish my story I may say that on the following (Easter) Sunday my party went up to take afternoon tea with Mrs. Dickson and Miss Cummings on the terrace of the hotel. Also there was Mrs. Matley, whose husband was on a geological excursion. It was a very pleasant occasion. In the entertainment was a selection by the orchestra from



Madame Butterfly, and we had a look into the Garden as we came away. (This famous hotel was almost destroyed in the riots on Jan. 26, 1952).

#### Excursions and Entertainments

We were invited to the Arabian Theatre for the evening of Monday but we did not attend. On the following day Congress members were to visit the Arabian Museum in the morning and the principal mosques of the city in the afternoon, but I did not go to these. In the evening at 9.30 there was a reception at the French Institute of Archaeology which we had to omit.

As my spasms of coughing had not entirely disappeared, Jean on Tuesday morning telephoned to our physics friend Phillips regarding a doctor and he recommended Dr. Robert Brown. In the evening we called on him. On examination he said the trouble was all in the larynx, and he gave me a prescription which I got filled at the well-known chemist's shop of Norton & Co. I coughed especially when I was tired and Dr. Brown advised more rest.

On Wednesday there was an excursion to old Heliopolis in the morning and to the Barrage in the afternoon. The former, seven miles north-east of Cairo, was one of the most ancient cities and was called On by the Egyptians. Pharoah gave Joseph "to wife Asenath the daughter of Poti-pherah priest of On" (Gen. XLI 45). An obelisk of red granite, one of two erected about 2000 B.C., is the chief remaining monument. The Barrage is 16 miles north-west of Cairo. The object of the Barrage du Nilis to keep the water-level in the Delta uniform at all seasons. The Barrage and the Assouan Dam, the largest structures of their kind in the world, are the two greatest physical improvements



to Egypt and both are due to British engineers. We were anxious to visit these two places but decided to omit them both.

### The Congress Banquet

We were at the Congress on Thursday morning but rested in the afternoon. In the evening there was an outstanding feature of the programme, namely, a Banquet offered to members of the Congress by the Committee of Organization. It was given at the Heliopolis Palace, a superb modern hotel at the Heliopolis Oasis, seven miles north of Cairo. It was at this suburb that our friend Phillips lived. This modern suburb was founded by a Belgian company in 1906, and I was told that the central building was intended to include a Casino as at Monte Carlo, but British influence prevented that. It was certainly a palatial hotel, finished in marble. I never saw anything more imposing. It was set in a beautiful grove of palms.

We went by special train. The dinner was good, but not superior. There were expensive wines which some of the guests seemed to value highly. I was never at a dinner at which the different operations were carried out simultaneously with such precision. When the plates were to be changed, at a signal the bare-footed waiters rushed out and brought the empty dishes in and then equally swiftly carried out the next course. They had been trained to move in unison with a minimum of disturbance.

There were promiscuous speeches during the drawn-out meal which I did not admire greatly, and we thought a Frenchman (Pelliot) did not just "play the game". He over-flattered the Egyptians and by inference disparaged the British.



We returned by electric tram which left Heliopolis about 11 o'clock and we were in Cairo before midnight.

#### Another Doctor

As my cough persisted Jean telephoned Dr. Brown who very frankly suggested that we consult a throat specialist and recommended Dr. Roeder, a Swiss physician. We went to see him at 4 o'clock on Friday. He was a quick and skilful operator. He said the trouble was all in the larynx and prescribed codeine in syrup and also some pastilles. We were favourably impressed. This was Good Friday and I kept quiet the rest of the day.

Next day we went to the Congress building and got our certificates to travel at half-rate to Luxor and back, and then on to Eel Kantara on the Suez Canal; also we arranged for our sleeping accommodation when travelling from Luxor to Cairo and from Eel-Kantara to Jerusalem.

At 4 o'clock I called on Dr. Roeder again and he painted my larynx, sprayed my throat and made a general examination. He said there was improvement, which I myself recognized.

#### Easter Sunday, April 12

A beautiful day! At about 9 o'clock we left to visit the Pyramids again. We went by the electric tram, and from the Pyramids station took a taxi to the top of the hill on which the Great Pyramid is. Then Jean rode on a camel half a mile down to the Sphinx. I took various interesting pictures and had several encounters with importunate vendors of scarabs and other factory-made relics. We had a fine morning and got back for lunch.



In the afternoon we walked up to Shepheard's Hotel for Mrs. Dickson's Tea, as I have already related.

In the evening we went to All Saints Cathedral to an Easter service but the speaker was not very intelligible. I noticed that the walls were well covered with memorial plates. Many of them bore dates within the period 1880-85. I thought Britain had paid the price of many lives to bring order and stability to this part of the world.

#### Easter Monday, April 13

My throat was decidedly better. In the morning Will and I attended some business matters, as we were to leave Cairo in the evening for a trip up the River.

At 4 p.m. I called on Dr. Roeder. His treatment was beneficial and I paid him 150 piastres (\$7.50). Also I paid Dr. Brown 50 piastres. We thought both superior physicians. We had tea at the noted Groppi's confectionery and got home at 6 p.m.

We took a taxi to the station, and after a little delay caused by an officious porter who demanded too much for carrying into the station two bags and who was expeditiously hustled out by two helpers at the gate, we got our berths in the sleeper on the special train for Luxor.

#### Luxor, Karnak, Tombs of the Kings

We travelled all night and had breakfast next morning soon after 7 o'clock. At 7.45 we stopped at Aoudad Amr where we crossed a north-bound train. This was a town of some importance, and for no evident reason there were here several police, on foot and mounted armed with rifles.



As we came along we saw men in the fields, squatting on the ground cutting the grain with sickles while others bound it and loaded the sheaves on camels. Some with baskets went behind to glean, and the children played about and watched the sheep and the goats. We saw also threshing the grain by flail or by driving over it a contrivance something like a sleigh on rollers. Others were winnowing away the chaff. Also on the way we saw persons plowing with the same old wooden plow drawn by ox, camel, buffalo, donkey or these yoked in pairs.

We reached Luxor (424 miles) at 9.20 a.m. and drove to the Winter Palace. This is a real palatial hotel. It is situated on the river bank amidst beautiful grounds. Ordinarily it is full of far-travelled patrons, but the "season" was just closing and there were many vacancies, and delegates to the Geographical Congress were given special rates, in most cases one-half.

After getting settled in our rooms we walked over to the great Temple of Luxor which is just north of the Winter Palace. Many delegates were already there. There was a notice posted at the Hotel asking us to assemble at 10 o'clock, but we had not seen it. The Inspector of Antiquities, Tewfik Boulos, was in charge of the party. He was a big tall man and spoke good English which he had learned at a Mission School at Assiut. He kindly gave our party some special attention, to make up for our lateness.

This temple was built by Amenophis III of the great 18th Dynasty (1540-1501 B.C.). Ultimately, it was 284 yards in length. It was most



interesting and impressive. There were many pylons, columns, colonnades, colossal statues, and great walls, covered with reliefs and inscriptions. As it was spread out before us it seemed all clear to examine and study, but I learned that fifty years earlier, that is, about 1885, the ruins were largely hidden by houses built within the ruins and covered by drifted sand or by rubbish from the ruins themselves.

### Karnak and its Temples

Just north of Luxor, extending along the river, is Karnak. After lunch we drove to it. Mr Boulas was there and escorted the English-speaking people over it. The word "stupendous" best describes what we saw.

The most outstanding object was the enormous Temple of Amon. This was not constructed on any single uniform plan. Actually it was begun in the XII Dynasty (c.2000 B.C.) and the successive rulers of Egypt added to or adorned the shrine. It attained its greatest glory in the XIX Dynasty (1315-1200 B.C.) but was still great through the XXV Dynasty (712-663 B.C.). It began to decay during the Roman Period (30 B.C. - 395 A.D.). Much work has been done to restore this and other temples at Karnak, as this is the chief tourist centre in Upper Egypt. The famous ancient city of Thebes included both sides of the river here.

We had tea on the top of one of the ten pylons of the great temple of Amon. It was given by the Mudir (governor) of this province, a kindly fat man wearing a linen suit and a red tarboosh.

### Valley of the Tombs of the Kings

Next day, (Wed. Apr. 15) we gave our attention to the west side



of the Nile. At 8 a.m. we left the Winter Palace and were ferried across the river; then we climbed into a 2-horse carriage with a canopy over it as a protection from the sun. There was quite a long procession as we drove over the dusty road two or three miles to the great Necropolis in the rocky hills in the west.

First, we visited the tomb of Seti I (of the XIX Dynasty, c.1370 B.C.). This was discovered by Belzoni (1778-1823) in 1817. We entered and walked down flights of stairs and through corridors and rooms of various dimensions, all illuminated by electric light, a total length of 328 feet, excavated from the solid rock; and the floor of the last chamber is about 180 feet below the level of the entrance to the tomb. The walls and ceilings are covered with carvings and inscriptions, in general well preserved. They are largely from the Book of the Dead. Boulos, who was with us, explained the significance of it all.

However the sarcophagus with the mummy of the pharaoh was not there. The tomb had been plundered perhaps about 1000 B.C. and the mummy had been taken away. Just what all had been done with it is not known, but along with others it was hidden again in another place in the mountain, where they were discovered accidentally in 1872. The mummy of Seti I is now in the Cairo Museum, where we had gazed upon the uncovered face of this powerful monarch.

The sarcophagus, with some difficulty, had been removed by Belzoni and had been taken to England, where Belzoni tried to dispose of it to the British Museum, but without success. However it was sold, at the price asked (£2000), to Sir John Soane who placed it in



his Museum in London. It is a wonderful production, - made from a single block of alabaster.

The overall dimensions of the sarcophagus are: length, 9 ft. 4 in., width 2 ft., height 2 ft. 8 in. The cover is not there; when complete its greatest height was about 1 ft. 3 in., i.e., the total height was 3 ft. 11 in.

I visited the Museum in August 1928.

Next we went to the tomb of Amenophis II (1447-1420 B.C.; of the XVII Dynasty). In this instance there was the sarcophagus of sandstone, within which was the mummy-shaped coffin containing the body of the pharaoh Amenophis, wrapped in its shroud and still adorned with garlands, - all there and illuminated with electric light. It was a memorable sight.

Then we drove to the ravine of Dehr el-Bahri, to inspect the Temple of Queen Hatshepsut. She is declared to have been the first woman of history. Its size and situation give an impression of magnificence. The Queen had her achievements inscribed on the walls of the Temple, but her jealous brothers defaced these records. However, enough could still be read to show that she was a remarkable queen. On the way from here we passed the two famous colossi of Memnon. They are about 65 feet high and both really represent Amenophis III (1411-1375 B.C.). In the Roman period they were taken to be statues of Memnon, who slew Antilochus in the Trojan war.

We reached home at 1.30 p.m. and rested in the afternoon, chiefly in the garden among the palms.

Wednesday, April 16

This morning we started from the hotel about 7.30 and soon



got across the river, where our old carriage with fresh horses was waiting for us.

First, we inspected the tomb of Nefret-ere Mi-en-Mut, wife of Ramses II of the XIX Dynasty, the most celebrated of all the Egyptian Kings. We saw his mummy in the Cairo museum. The walls of this tomb were plastered and on them were some fine paintings. The portraits of the Queen were specially pleasing. The ceiling was made to represent the dome of the sky with the stars upon it.

Then we went to the tomb of Khamweset, son of Ramses II. Here also there were paintings on plaster in excellent preservation.

After this we went to Medinet Habu (town of Habu) which contains the most southerly temple-group in Necropolis. In it is the mortuary temple of Ramses III (1200-1179 B.C.; XX Dynasty) whose tomb is in the Valley of the Kings and whose mummy is also at Cairo.

Following this we went to the Ramesseum, the Temple of Ramses II. It was largely in ruins - through the passage of the centuries, assisted perhaps by some persons in want of building stones. Within the First Court of the Temple, lying on the ground were fragments of a colossal statue of Ramses II. On them were well-preserved hieroglyphics of Ramses' name which made certain its identification. The length of the ear was  $3\frac{1}{2}$  ft. and the total weight must have been 1000 tons.

Finally we inspected the tomb of a nobleman in which the funerary temple and tomb were combined. The sarcophagus and the stele from it were lost on the way to the U.S.A. in 1915.

We got back to the landing about 12 o'clock and gave the driver



150 piastres and ten more for a 'tip', whereat he vociferously complained - but to no effect! It was a pleasant and interesting morning. In the afternoon we rested.

Friday, April 17

This was to be our last day at historic Thebes and the Winter Palace. On the three previous days we had been personally conducted about the ruins by the capable and agreeable Inspector of Antiquities.

A few drops of rain fell last evening and a slight shower this morning, and the weather was cool with a westerly breeze. So after breakfast my friend Will, Dr. Matley and I started out northward on a leisurely trip of our own. We got as far as the mighty Temple of Amon, at Karnak, about two miles from the hotel. We wandered through the great pylons, examined the two 100-foot-high obelisks and marvelled at the mighty columns in the Hypostyle Hall, which was considered one of the wonders of the world.

I also photographed a threshing place near-by and some of the natives. In one group there were one woman and five children, the woman and two of the children bearing baskets on their heads. On the day before, near Medinet Habu, I photographed a sakiyeh, a contraption for raising water from the river for irrigation. These scenes brought home to me how narrow was the arable strip of land along the river.

We enjoyed our expedition very much. We got back to the hotel and had our last lunch.

At 4 o'clock my suitcase was ready. We drove to the station, one-fifth of a mile east, and purchased our half-fare tickets. For the four of us the cost was £e 5.78 or \$29.30. We left at 5.15 p.m.



and arrived in Cairo at 7.30 next (Saturday) morning.

### Back in Cairo Again

At once we drove to the Grosvenor House and were given our old rooms again - it seemed like home. We received letters from home folk; also I got my hair cut for 5 piastres  $\frac{1}{2}$  piastre to the boy who kept off the flies! I got photographic prints and fresh films. I found that my prints were excellent.

In the afternoon we had a little time on our hands and Jean and I engaged a carriage for an hour (12 pias.). We went over the modern Bulak Bridge, which is 300 yards long, a short distance down the river. This quarter of Cairo gives a more characteristic picture of Oriental life than that where we had been stopping. We passed several mosques, one dating back to 1573, and, curiously enough, in convenient locations, a Scottish Presbyterian Church (St. Andrew) and a French Protestant Chapel. We had great difficulty to get our driver to take us where we wanted to go, although before starting out we asked a native merchant, before whose shop he had drawn up, to explain to him what we desired to see. Best he was especially stupid. Perhaps he could not understand how anyone could wish to see that portion of the great city.

However we kept him on the job until he had explored several sample streets with their native shops, had driven us along the life-giving river, then over the Kasr en-Nil bridge and home.

At 6 o'clock we all went to the Metropole Cinema, the programme consisting of "Gambling Wives" and several 'funnies' or 'sillies'. But we found it did not begin until 6.30 and we had to



leave during the long film in order to get home for dinner. The films were from the U.S.A. Of course it was the 'silent' film. The headings were in French but on a small screen near-by they were given in English and Arabric, but very often these were not 'in phase' with the French heading. It may be remarked that in Cairo we picked up two current copies of the S.E. Post (Apr. 4 and 11) at 6 piastres each.

Sunday, April 19, 1925

In the morning Jean and I walked over the Bulak bridge to St. Andrew's Church and heard a middle-aged man preach in the language we were accustomed to in Ontario.

At 5 p.m. we left the Grosvenor House in two 2-horse carriages for the Central Station. We purchased our half-fare 1st Class tickets to El-Kantara, "The Bridge", (120 miles), £ E 5.13 for two of us. It is on the west bank of the Suez Canal and is 28 miles from Port Said.

We reached ElKantara at 9.30 p.m. and had to cross over the canal to board the Sinai Military Railway which would take us to Jerusalem. A representative of Cox and King came into our compartment and offered to transfer us to the train on the other side at 10 piastres per person, to which we agreed. We quickly passed customs, were ferried over the canal in a skiff, had our passports examined and passed, and then we went to our berths - at 10 o'clock.

The starting was to be at 12.01, but it did not waken me. At 7.30 next morning we got up and the sleeping car porter brought us



a cup of tea. There was no milk, the tea was poor and the small 'biscuits' were of poor quality, - but we paid 15 piastres apiece.

Next No. 3, Palestine (and Syria)

May 10, 1952



Ch. XXI A Visit to Mediterranean Countries and  
Great Britain

(3) Palestine and Syria

Arrival at Jerusalem

We reached Jerusalem at 9.15 a.m., Monday, April 20, and the people getting off created an active scene although many had gone on to Haifa.

The distance from El-Kantara to Rafa, on the boundary of Palestine, was 126 miles; from Rafa to Sudd, 70 miles; from Sudd to Jerusalem, 34 miles; or 230 in all. The route followed is that of the ancient caravans between Egypt and Syria. From El-Kantara to Haifa the distance is 260 miles. The road into Jerusalem was a steady climb, made with a small-sheel locomotive.

Looking out of the car window as we came into the station we saw a man walking along the platform calling out "American Colony" and we hailed him. We soon got into a big motor car, with our luggage, and drove to the American Colony houses on Damascus Road. We had written beforehand for accommodation and were received cordially. The buildings were all of stone and bore different names. Jean and I were assigned to the "Prophet's Room". It was reached by a stone-and-iron staircase. It had a door on one side and windows on the other three. Our friends occupied "Joseph's Room".

We proposed to spend a week in Palestine and received much assistance from the members of the American Colony.

Via Dolorosa, Gordon's Tomb

The old city is surrounded by a stone wall 35 feet high, in which are seven gates, but as we moved about the crooked narrow streets we



used chiefly the Damascus and the Jaffa gate. The population of the city was given as 80,000 and the area outside the wall was greater than that within it.

In the afternoon of our first day we walked along the Via Dolorosa to St. Stephen's Gate. Just there I spied out the pool of Bethesda, but there was little or no water in it. On the way home we were looking for Gordon's Tomb (or the Garden Tomb) when a young man offered to assist us. He was Theodore Mayer (of St. Louis, Mo.), who had been at the American School of Archaeology for nearly a year. He showed a round stone (shaped like a large grindstone) and explained what was meant by "rolling away the stone", but it was too late to gain admittance to the Tomb.

Three days later we all walked in the morning to Gordon's Tomb. We were received there by an Anglo-Israel Irishwoman from the south of Ireland who outlined reasons for thinking this was the original tomb of Joseph of Arimathaea wherein the body of Christ was laid. The hill was in a very public place, such as was used for executions. The tomb was large, such as a rich man would have. It was lighted from above, very unusual, but this would allow anyone within (the angels in the morning) to be seen. It was very realistic.

We were not convinced but were profoundly impressed. What we saw was a wonderful example of a tomb as described in the closing chapter of the Gospels.

Then we went to Ecce Homo Arch. The four of us and two men from Cleveland were shown about by a Sister of Zion. All this was very interesting and the evidence was strong that it was here that the Jews demanded the crucifixion of Christ. We were informed that this



religious order had four schools in Alberta and Saskatchewan.

My friend Will and I found our way down to the Wailing Place, where there were 12 or 15 Jews (Thur. Apr. 23, 4 p.m.) Then we came up, went through St. Stephen's Gate, down the Valley of Jehoshaphat, looked in the Garden of Gershebane and then went on to where the Palestine Exploration Fund was excavating the City of David. Every step was historically interesting. Then we walked back to the city wall, entered by the Dung Gate and after many turns through the narrow streets reached the Damascus Gate, and half a mile further was the American Colony.

#### Bethlehem and Mount of Olives

On Tuesday Morning we drove in a large open Buick car to Bethlehem. The road was good and the distance only five miles. Mr. Meyer of the American Colony which owned the car and were agents for them, went with us. On the way he pointed out various places of interest;  $2\frac{1}{2}$  miles from Jerusalem, the traditional Well of the Magi, where they are said to have seen the guiding star (Matt. 29);  $4\frac{1}{2}$  miles, the Tomb of Rachel, revered by Moslems, Christians and Jews; the Shepherd's Fields; Zelzah, where Kish, Saul's father lived; David's Well, associated for centuries with David's longing for a "drink of water of the well of Bethlehem" (2 Sam. XXIII 15), but at present the water is unwholesome. The entire neighbourhood was full of traditions and memories.

Bethlehem had a population of 11,000, nearly all Christians. Mr. Meyer guided us through the Church of the Nativity. We were pleased to see the traditional birthplace of Christ, but we received somewhat



of a shock to see a British soldier standing motionless near at hand, with the butt of his rifle resting on the stone floor and a gleaming bayonet fixed at the muzzle. However when we read the past history of this Church we find that such incidents have occurred before. I also read (in the Encyc. Brit.) that the dispute in 1847 about the right to mark in this Church with a star the precise place of the birth of Christ became one of the prime causes of the Crimean War.

However we were impressed with the grand simplicity of the interior of the Church, and Mr. Meyer pointed out its chief features.

Then we returned to Jerusalem and drove to the Mount of Olives, going past the new Jewish University and the Official Residency of the High Commissioner, which was formerly a German establishment, the Empress Augusta Victoria Endowment. We ascended a minaret and had a fine view of Jerusalem to the west and beyond it to the Mediterranean Sea 35 miles away. To the east at half that distance was the Dead Sea and the Jordan River. That illustrates the small size of Palestine compared (say) to our great Dominion. We were back for lunch at 12.30.

In the afternoon we all walked down through the Damascus Gate and along the Via Dolorosa to the Church of the Holy Sepulchre where it ends. We had made a short visit to the Church before but were not very favourably impressed. There was too much tawdry decoration and too much was claimed for it. Four sects, I was told, had proprietorship in the church, and it seemed to have had a wonderful history over the centuries, but I was not drawn to it.



A curious ceremony performed at Easter, of which I felt critical, was the Miracle of the Holy Fire. I thought it was a matter of deception. Many thought the fire came direct from heaven and they tried to light their candles from it and carry them home.

Then we went to the American Colony Stores where we bought some souvenirs, including a beautifully made brass vase. On it was an Arabic inscription which a young man in the employ of the company translated as, "Contentment is a great treasure". I treasure it still (1952).

We also discussed our passage to Beyrout to take ship and accepted the firm's offer to drive us there in an automobile.

#### The Temple Area

Every day had its interesting events. On Wednesday morning, with Mr. Beaumont as our guide, we went to the Temple Area, which is considered the most interesting and important part of Jerusalem.

When I was a boy I used to look at the illustrations in the Cottage Bible, particularly the two pages showing the Tabernacle within the Court and this within the Camp. Inside the Tabernacle were the Ark, the Alter of Incense, The Table of Show-Bread, the Golden Candlestick, and other objects. Outside it and within the Court were the Laver, the Altar of Burnt Offering, and other things - all listed in the Book of Exodus and the Book of Numbers.

I thought this elaborate organization was fantastic, mechanical; but here we were on the very spot where all this was said to have taken place!



It was universally believed that "David built there an altar unto the Lord, and offered burnt offerings and peace offerings". (2 Sam. XXV, 25). Also Solomon's Temple and his Palace were erected here, occupying, it is believed, the location of the present Dome of the Rock. After this was a Second Temple and later still a Third Temple, that of Herod, which was destroyed in 70 A.D.

This 20-acre area is full of history, sacred and profane.

The chief building in the area is the Dome of the Rock, often called (wrongly), the Mosque of Omar. The date of its erection is given as 691 A.D., but it has had many restorations and alterations since then. It is octagonal in form, each side being 66 ft. 7 in. in length. There is an abundance of beautiful columns, vaulted arches, marble slabs, porcelain tiles and other architectural features, to make the structure strong and beautiful.

The Temple Area has been in the hands of the Moslems since 1187 when Saladin captured Jerusalem.

The Holy Rock is exposed to view within the beautiful building and arouses one's curiosity. It is 58 ft. long, 44 ft. wide and rises 4 ft. 6½ in. above the surrounding pavement. There is considerable mystery about it. Perhaps at some time excavations in the neighborhood will be permitted.

On our visit the entrance charge was 15 cents and we were given a "Brief Guide" to "The August Sanctuary", published by the Supreme Moslem Council, and among the important notices on the front page was:



Visitors should bear in mind that the whole of the Haram Area, and not only its edifices, is sacred to Moslems; and that they will be expected to pay due regard to its sanctity. In particular they must abstain from smoking anywhere in the Area, and from bringing dogs with them.

### Jericho and the Dead Sea

At 2 p.m. we left in a Buick car and drove down the Jericho road, past Gethsemane and the Jewish Cemetery, past Bethany, past the Good Samaritan's House which is half way to Jericho, on to the Dead Sea. The latter part of the road cannot be travelled when wet. A few houses were beside the Dead Sea and two or three small boats were on it. Its surface is actually 1290 feet below the Mediterranean Sea which is only 46 miles away. On the farther side of the Dead Sea, about ten miles off, were the Moab mountains and Mt. Nebo was pointed out to me. I took a photograph, being desirous of having a record of the lovely burial place of Moses. The water was very salty and bitter, and the temperature in the valley was much higher than in Jerusalem. The road we had taken on the way down was very crooked and full of steep gradients, but our driver skilfully conducted us continually up and down and around.

Then we went on to the Jordan River, to the place where John is thought to baptized Jesus. Near here we got a drink of lemonade at a Greek's shop. To interest his customers he had a stuffed hyena, a stuffed wild pig and a live partridge.



Then we drove to Jericho, old and new, and visited Elisha's spring which causes the plain about Jericho to bloom like Paradise, - bananas, oranges, and other fruits growing in profusion. It was a very pleasant afternoon and we reached the American Colony at 6.30 p.m.

Hebron and the Ancient Oak of Mamre

At 9 o'clock on Friday, April 24, with Mr. Meyers as our guide, we left in a Hudson-six for Hebron, which is 23 miles south of Jerusalem.

First we drove to the south of the south wall of the city and Mr. Meyers showed us the location of the Pool of Siloam. It is 52 feet long and 19 feet wide. This is connected, by means of a crooked tunnel 583 yards long with Spring of the Virgin. Meyers told us that he had passed through this tunnel twice although there is danger in doing so since at some times the water fills the passage. The Spring of the Virgin is intermittent. In the rainy winter season the water flows from 3 to 5 times a day; in summer twice and in autumn once a day. The physical explanation is that in the interior of the rock there is a natural reservoir into which the water collects and when it is filled it starts a siphon flowing. This empties the reservoir and it then starts to fill again. It is called an intermittent siphon.

We also saw some excavations which revealed an old pavement of the city, including mosaics, a street, a mill along with which where found old measures made of crockeryware. A new church was being built about one-third of a mile west of the Pool of Siloam,



on a site supposed to be that occupied by the house of Caiaphas.

Aster this we drove on past the Pools of Solomon, the Tomb of Rachel, the village of Bethlehem and came to Hebron. On the way we had to stop at a Police Station to report who we were and whither bound.

Hebron is a very ancient place and is still important, - with a population of 22,000. We found the streets full of well-dressed children and their elders, celebrating a day of feasting after the long fast-period of Ramadan.

We went up to the Mōsque, but were not allowed to go beyond the sixth step. There was then on a feast-time of four days, during which the mosque was closed to strangers. Then we saw the Pool (in the middle of the city) near which David hanged the murderers of Ishbosheth, the son of Saul. (2 Sam. IV. 12)

Following this we went north-west from the city through a rough narrow passage-way, with stone walls on each side and no room to pass another car, until we came to the gate of the Russian Hospice. After much tooting of our horn the woman came down and opened the gate (of iron) and we drove through it and up to a clump of cypress trees.

We got out and had our lunch beneath the near-by ancient Oak of Mamre. Mr. Meyers discussed the Biblical references to the country about. The Arabic name of Hebron is Khalil er-Rahman, i.e., (The City of) Abraham, the friend of God.

At about 2 o'clock we started out again, and this time we stopped to examine the Pools of Solomon, which are eight miles from



Jerusalem and form a part of its system of waterworks. The third pool is 194 yds. long and about 60 yds. wide; the others are not quite so large. They are partly hewn from the rock and partly enclosed by masonry. They are filled by springs, the country round being well supplied with them.

Not far away we saw a 'bunch' of women filling their goat-skins (many of which were made in Hebron) at a public spring. I thought this was a pleasing and historic scene and, with the gentle persuasion of a silver coin, one of them hoisted her burden to her back, and, supporting it by a cord against her forehead, allowed me to take her photograph. We reached home about 4 o'clock after a very pleasant excursion.

#### Getting Ready to Leave

On Saturday morning Will and I went into the city, obtained the necessary funds from T. Cook and Son and paid our account at the American Colony Store. Our accommodation was £ 1 per person per day, i.e., £ 14 for me. For our trip to Beyrout it was £ 30 for us all, or £ 15 for Jean and me.

Then I threaded my way through the city's crooked streets to the Damascus Gate where Jean was awaiting me and for the last time we walked along the Via Dolorosa, through St. Stephen's Gate and down to Gethsemane, where we rested awhile. On going home we picked our way north of the city wall, past the Mohammedan Cemetery and Gordon's Tomb and the Tombs of the King.

In the afternoon I went into the city and arranged for various photographs to be made and sent to me at Naples. After this Jean and I walked out to a hilltop and watched the sun set.



### Religious Service

Sunday, April 26, two weeks after Easter, was fine and sunny. At 10 o'clock there was a service in the house and Jean and I attended. The American Colony had its own hymn-book. It was dated 1896 and contained some 125 hymns, of which about a dozen were credited to H.G. Spafford. I believe the original company came to Jerusalem in 1881 in expectation of the second coming of Christ. I understood that H.G. Spafford was a lawyer in Chicago, and that the only survivor of the original adult party in 1925 was Mrs. Whiting. A Mr. Spafford was then at the head of the Colony. He told me he was an adopted son of the original leader. He spoke with a foreign accent which I took to be Swedish.

About forty were at the service. First of all, two hymns were sung. One of them was "O Galilee!" This was followed by prayer by Mr. Dinsmore, a bible reading by Mr. Spafford, another hymn, a prayer of the "hortatory" type and the service was over by 11 o'clock.

There was afternoon tea at 4.30, with many of the Colony on hand who usually were at business. Then the four of us went for a walk to the top of the first hill on our way to Tiberias. We had chicken dinner at 7.30.

### From Jerusalem to Tiberias

On Monday, April 27, at 8.15 a.m. we started out in the Buick-six, with a tall young Arab named Khalil Kamel in charge. We bade good-bye to the American Colony with regret.



On our way to Tiberias we passed through many well-known places, including Ramah, Beeroth, Bethel, Lubban, Shechem, Dothan, Jenin, Gilboa, Plain of Esdraelson, Mount Tabor, Cana. Mr. Spafford had supplied us with a list of these places, with scriptural references to them.

From the American Colony we brought lunch, which we ate under a tree just before we reached Nazareth. The route was up-and-down hill with numerous hair-pin curves.

At last, at 4 o'clock we pulled into Tiberias, 110 miles from Jerusalem. This place had a population of 8600. It is located on the west side of the Sea of Galilee (or Lake of Gennesaret) the surface of which is 680 ft. below that of the Mediterranean Sea. We put up at the Hotel Tiberias, a clean and well-kept place. We went for a walk through the narrow crooked streets - much like Jerusalem - and sat for a while in the public gardens where there was a tennis court. After dinner I sat for a while beside the lake, and a boy came down leading a donkey with a pair of empty oil-cans slung over its back. They waded a short distance into the lake and the boy filled the cans. The water, I learned, was used for drinking by those who dwelt beside it. The lake is 13 miles long and  $7\frac{1}{2}$  wide and the Jordan river flows directly through it from north to south. As we know from the New Testament, sudden violent storms may occur on it.

#### On to Damascus

We left Tiberias at 8 o'clock next morning, travelling northward and skirting the lake. About three miles on we passed through



Magdala, whence came Mary Magdalene, and ten miles on our way was Capernaum, which recalled many incidents in the life of Christ. For much of the time, along the shore the road was 30 to 40 feet above the water and the views were very pleasing. The oleanders which grew in profusion along the shore were very attractive. I had never seen them growing "in the open", like a rose-bush, before. At Capernaum there were many ruins, supposedly from the ancient city. There was an abundance of columns with Corinthian capitals. We were shown about the place by a Franciscan monk.

Then we proceeded as before, up-hill-and-down-again, and in a few miles came to Jisr Benat Yakub (Bridge of the Daughters of Jacob), over the Jordan river which is about 80 feet wide here. This bridge has four stone arches, three of them 500 years old, the fourth added in 1904. This bridge was on the caravan route from Egypt to Damascus and the Euphrates regions. Here was a Gendarmerie Post and our passports were examined on both sides of the river. There were many oleander trees as well as thorny underwood and pseudo-balsam trees around.

After crossing the river the road at first was very rough, but about 15 miles ahead we came to El Keneitra, a modern village of 1300 persons, where we had to show our passports to a French officer again. This was at about 11.30, and caused some delay. Then we went forward and came to the head waters of the Abana (or Barada) river, near an old Khan, where we stopped for lunch. It was a rather public place, and there were some women washing their clothes by beating them on stones submerged in the flowing



water. After this we had good level road, and at about 4 o'clock we came to Damascus, entering it on a dusty road between mud walls.

By telegraph from Jerusalem, rooms had been reserved for us at the Damascus Palace Hotel which that day was crowded with French-speaking R.C. pilgrims. When they vacated their rooms next day their places were taken by a company of Spanish-speaking people, but our accommodation was safe.

We were interested and pleased with Damascus. It is the largest city in Syria, with an estimated population of 300,000. It has many trees, which were attractive at the spring season. Following the description given in the Koran, the Arabs picture to themselves Paradise as an orchard, traversed by streams of flowing water, where the most delicious fruits are ever ready to drop into the mouth.

Next morning Khalil drove us to the big Mosque which is a very important centre to the Moslems. Then we saw the tomb of Saladin (1138-1193), the "Street which is called straight", the workshops of Nassan where a salesman was anxious to ship to me in Toronto a writing desk made from olive wood. The streets are much like those of Jerusalem but not quite so narrow. Damascus is on a larger scale. There is plenty of water as the river flows through the city.

We rested until 4 p.m. and then Khalil took us for a drive along the road which follows the course of the Barada for many miles. In some places the stream is split up into four or five parts which flow in different channels at different levels, and



tea-rooms and picknicking places are arranged along them.

To Baalbek, April 30

We left Damascus at 8.45 a.m. We paid our bill in Syrian money and were much confused with Egyptian and Syrian pounds and French francs. The Syrian £ was about equal to \$1. A few days later we had to deal with Turkish pounds which were worth about half as much.

One could go to Baalbek by railway but the route is not very direct. Syria is well covered with mountains, having the Lebanon and Anti-Lebanon ranges, and the great Mount Hermon system in the south. From Damascus to Reyak one goes north-west  $48\frac{1}{2}$  miles, waits there a couple of hours and then goes north-east 16 miles to Baalbek, or  $64\frac{1}{2}$  miles in all.

By highway the distance is about 45 miles, and we arrived at 11.45. There were hills at first but we passed over a beautiful fertile plain into Baalbek. Much of the way we followed the course of the Barada river. Its chief sources are in the Anti-Lebanon mountains and it ultimately discharges into a lake 18 miles east of Damascus.

Before leaving Jerusalem we had secured by telegraph rooms in the Grand Hotel of Palmyra at Baalbek. It was well that we did so as we found the French pilgrims to the number of thirty were there ahead of us. Directly in front of the hotel were the remarkable ruins of two Roman temples dating from the second century A.D. They had been injured by an earthquake and the Roman Emperor Theodosius the Great (379-395) destroyed the great temple of



Jupiter and built a church opposite the facade of the old building. From our bedroom window we had a splendid view of the ruins with the mountains in the background.

In the afternoon our party engaged a young Arab guide (born in Savannah, Ga.) to show us over the ruins. They were truly wonderful; the Romans were remarkable people. Emperor William of Germany was here in 1898, as he was also in Jerusalem. He noticed an eagle carved on a keystone which was on the point of falling down. Paying the Sultan £16,000 for the privilege, a German expedition spent four years in excavating. There were some enormous stones in the substructure of the Temple of Jupiter, one being 64 ft. long, 10 ft. wide, 12 ft. deep. There were also columns of red granite from Assuan, broken by earthquake. In the inner court of the old Temple I noticed and photographed a heap of big spherical stones, a foot in diameter, which had been made to be thrown by catapults; and at the same time visitors moved about and a cow quietly ate the grass.

The land about Baalbeck seemed fertile and there was abundance of water.

Khalil met us as we came out, and drove us about a mile eastward to the spring which supplies most of the water to the town; and then to the ancient quarry a mile to the south. Here was an enormous hewn block not yet separated from the rock. It was even larger than the three big ones in the Acropolis wall, being 70 ft. long, 14 ft. high and 13 ft. wide. The volume of that stone is 12,740 cu. ft. and with a specific gravity of 2.7 (limestone)



it would weigh 1000 tons.

There were candles in our rooms. The proprietor of this and other hotels here was A. Loup and he was anxious to secure summer visitors, as the climate is cool and pleasant. On account of its altitude snow falls in the winter and it is collected and stored in stone warehouses, to be used in the summer.

#### Baalbek to Beyrout

We were now ready to move on to Beyrout. The distance by air-line is about 40 miles, by railway is 91 and by road perhaps 80. First we went southwest along the valley of the Litany River, between the Anti-Lebanon and Lebanon ranges, until we come to Shtora (25 miles) where we reached the main road over the mountains from Damascus to Beyrout. Here we supplied fresh water to the radiator of the automobile and oil to its engine, and then started over the hills. This route was the most remarkable of all we had in our wanderings. Up-and-up we went continually by hair-pin turns, until at last we reached the top (4880 ft.)

On the way I photographed a caravan of camels led by a man walking behind a donkey. Near the summit I noted several stone storehouses for holding snow put in them during the winter, and I saw a "prairie schooner" taking out snow from one of them to transport it to Damascus. (I wonder if mechanical refrigerators have found their way into Damascus? - 1952).

The views from the summit to the west were wonderful. Down thousands of feet were villages on the sides of the mountains and we saw the narrow gauge railway winding in and out, climbing



the steepest inclines by the rack-and-pinion system. There were 20 miles of this railway thus equipped.

We reached Beyrout at 11.30; and at once went to the Lloyd steamship office to inquire about the sailing arrangements we had made from Cairo. We found everything was satisfactory, that we were to leave Beyrout on the morrow, May 2. We then went to Hotel d'Orient where we had lunch.

#### American University of Beyrout

At about 2.30 we went to the American University of Beyrout, which is located to the west of the city and not far from the sea. Beyrout had a population of 180,000. Mr. Crawford, a young member of the staff, originally from Wisconsin, took us about the grounds. There were numerous excellent buildings, including a well-equipped observatory. He located Cruickshank and Marjory Webster who took us to their house. We had tea with Charles A. Webster who was pleased to talk over old times in Toronto.

Webster came from Galt. He graduated B.A. in 1885. Then he went to Knox College and graduated in 1888, and after that he entered the Medical Faculty and became M.B. in 1891. During three years at Knox his room-mate was James A. Macdonald, afterwards well known as Editor of the Globe. Webster took great interest in student life and I became well acquainted with him. Here at Beyrout he was Professor of Anatomy in the Medical Faculty.

I did a little shopping - including photographic films, incidentally finding out that the German films were controlling the market. We also found a good bookshop and bought some magazines -



but not the current issues of the Sat. Eve. Post.

We engaged Cook's men to take us and our luggage from the hotel to the dock and then in a small boat out to the ship Campidoglio which was anchored a short distance out from the quay. We had been informed that the porters at the dock were a fierce bunch of pirates who would grab the passenger's bags (each taking one) and give him a rough time. Thus we got safely aboard and peacefully secured our rooms 25/26 and 27/28, which were perfectly satisfactory.



CH. XXI

THE MEDITERRANEAN

(4) From Beyrout to London

Saturday, May 2, was very pleasant and the water very smooth. The "Campidoglio" was an ordinary cargo vessel of perhaps 7000 tons with accommodation for a dozen passengers. We sailed at 10 a.m., travelling northward along the Syrian shore. At about 3 p.m. we reached Tripoli, a town of 36,000 population. Two French warships came along and anchored a mile from us. It is well to remember that France held the Mandate for Syria; also, there is a Tripoli in North Africa. After unloading and taking on cargo we sailed at 10 p.m. Among the stuff discharged was Ogilvie's "Warrior" Flour, and Davey's Australian Flour. The instruction, "Use no Hooks", was very plain, but it received little attention from the sailors.

Alexandretta in Cilicia, 100 miles from Tripoli, was reached next morning at about 10 o'clock. It is on the bay of that name which is where Syria and Asia Minor come together. It has a population of 12,000 most of whom have a yellow complexion, said to be due to the prevalence of fever. Five of our passengers went ashore to take a motor trip to Antioch, seventeen miles to the south. They took a lunch from the ship. Among the great quantity of freight discharged I noted cotton goods from Bombay, big bales of something-or-other from Japan, hard rubber tires from Italy. We took on considerable soap.

The people got back to the ship at 6.40 p.m. Among them was an elderly lady and her husband, named Porter, who sat next



me at table. I believe he was an instructor in a theological college in Eastern U.S.A. Also, two unmarried ladies, relatives of H.H. Langton, the librarian of the University of Toronto. They reported a very interesting time.

Mersina and Tarsus.

The ship sailed at 10 p.m., and our next call was at Mersina, 100 miles westward along the south shore of Asia Minor. It was reached at 6 a.m., (May 4). Much freight was discharged and received. Of the former there was Portland cement from Trieste—2670 bbls. of it to be used back in the country for buildings, including barracks; and cube sugar from Czechoslovakia. We took on great bales of cotton.

Mr. & Mrs. Porter went ashore, intending to go by rail (17 miles N.E.) to Tarsus, where the Apostle Paul was born, but through police formalities they missed the train. They then hired a carriage and were driven out to some ruins, which, it was afterwards learned, it was unlawful to visit without a permit! They had a dispute with the driver who would not accept what had been agreed upon—and they came away without giving him anything!

Adalia the Beautiful.

The ship left Mersina at 11.45 a.m., May 5, and reached Adalia, 226 miles farther west along the south coast, at 11 a.m. Wed. May 6. The speed was not great but travel upon it was comfortable and pleasant. This town, of population 38,000, is at the end of a shallow bay. Before arriving at it, perhaps a mile from Adalia, we noticed a number of streams falling over the cliff.



They added to the beauty of the scene, but I thought of power going to waste.

After lunch my party went ashore in a small boat. A Turkish officer on the ship wrote permission in our passports. Upon reaching the shore the passports were collected and were held until we wished to go back. The return fare was half of a Turkish  $\text{₺}$  or twenty-six cents. We walked about the place which, at one time, had massive fortifications. There were extensive remains of the ancient walls, including the finely carved triple gate of Hadrian, Roman Emperor 117-138 A.D. The streets were narrow and the bazars right on the side-walks, as usual.

While walking about the town a man overheard our talk or suspected our identity by our look, and joined himself to us. He was a Turk who had been in Montreal and then in Toronto for three years. Along with a Bulgarian, he kept a restaurant on King St. His father died and he returned in 1921, but the Greeks would not allow him to land (probably in Macedonia) and he drifted to Adalia. He wished much to go back to Canada. He said he used to make \$40<sup>00</sup> or \$50<sup>00</sup> clear each month in Toronto, but now a day's work would usually bring about twenty-five cents.

The town is picturesquely situated on the cliff and we greatly enjoyed our visit. We left at 5.30 to return to the ship. Adalia (Attalia) is mentioned in the New Testament, Acts 14.25. It was visited by Paul and Barnabas on their missionary campaign, about 45 A.D.



### Historic Rhodes

Westward some 150 miles is the island of Rhodes. Its area is nearly 424 sq. mi. and population about 30,000. The ship anchored off the capital, Rhodes, at the northeast end of the island, at 9a.m., May 7.

Immediately after breakfast we went ashore. The most prominent feature of the town is the old wall, with the buildings of the Knights of St. John which date back to their medieval glory, 1308-1522. We walked about the place, inspected the Museum, visited the bazars (very dear) and got back at 12 o'clock. The ship unloaded a great amount of cement—4000 bags, an officer told me.

Rhodes is a most interesting place. The old town was well fortified with walls and towers and moats. It was seized by Italy from Turkey in 1912 and the new town had many summer hotels, a fine bathing beach and beautiful mansions. It was comparatively clean, probably due to Italian control.

There was the celebrated Col<sup>o</sup>assus of Rhodes, a bronze statue of the sun-god, 105 feet high, famed as one of the wonders of the world. It stood for 56 years, when it was broken in pieces by an earthquake in 224 B.C., but its enormous fragments were not removed until 656 A.D., when they were sold to a Jew of the Saracens. We departed from Rhodes at 5.30 p.m.

### Chios and Mitylene

Picking our way northward for about 200 miles among the Sporades Islands in the Aegean Sea, we arrived at Chios at 9.45 a.m.,



Friday, May 8, and left at 12 noon. We did not get off the ship as our stay was to be so short. In our cargo discharged here were over 100 bags of cotton seed, some goods in cases and some hides. The capital city of Kastro (or Chios), on the east coast was a substantial-looking place. A picturesque feature of the island was its windmills on round stone towers.

Sailing about 60 miles north, at 5.30 p.m., we reached Mitylene, the ancient Lesbos, 670 sq. miles in area. We thought this island the finest we had seen. There were some fine houses and several pleasing villages near the port, as well as an old Genoese castle, built by the merchants of Genoa in the middle ages (say from 8th to middle of 15th century) who had widespread commerce. I had looked forward to stepping on Mitylene, but as it was so late we decided not to go ashore. However, some passengers did do so, and dinner was postponed until 8 o'clock for their return. But they said there was not much to see!

It was a balmy evening (May 8), with a lovely sunset behind the hills and a golden full moon in the east.

#### Smyrna and the Dardanelles

During the night the ship started forward, and on looking out of the port-hole at 7 a.m., we saw the shore half a mile away. The hills were green and the fertile level land near the shore was well cultivated. We anchored at Smyrna at 9 a.m. This is the largest city in Asia Minor, having a population of about 200,000, and we went ashore. In order to see more of the place we took an hour's drive; and, as in every case of transportation, there was a wrangle



over the charge. We thought they were plain robbers, but they certainly looked hard up!

There was considerable shipping in the harbour: two or three Italian, two English, one Dutch and several Turkish ships.

At the landing there were many Turkish refugees from Salonica. Indeed it was the toughest sight we had seen. Men, women, children, poorly dressed, huddled together! The Turks expelled by Greece deserve as much sympathy as the Greeks expelled by Turkey!

The bazars were good, the streets not so narrow as in Jerusalem or Damascus, and there were some really modern things (e.g., hardware) for sale. There were short four-wheel one-horse street-cars, and we saw two Canadian self-binders.

While at Smyrna the ship took on 300 sheep for the Constantinople market. On leaving, at 5 p.m., the ship sailed in a n.w. direction, and after dinner we watched the lights on the shore. Early in the evening Chios was well seen on the left and some hours later the great Mitylene grew into distinctness on the right. Next morning at 8.30 we were entering the Dardanelles.

This strait, the ancient Hellespont, connects the Aegean Sea with the Sea of Marmora. It is  $37\frac{1}{2}$  miles long. At the southern entrance it is  $2\frac{1}{2}$  miles wide but 13 miles northward it narrows to about  $\frac{3}{4}$  of a mile. Here is Fort Chanak, famous in our own time; and the town of Gallipoli is at the northern entrance at the Sea of Marmora.

On the left, upon entering the strait, was a big warship which had run on the shore; and not far away was the bow-portion of a ship which had been cut in two. There were forts, villages,



ruins; as well as monuments and crosses to mark the graves. On one occasion I thought I was looking at a ploughed field at a distance, but closer examination showed it was rows of graves marked by crosses! Turkish barracks were near every town, and several wrecks were on the shore.

This part of the world is full of history spread over the centuries. Of special interest to me was the site of ancient Troy or Ilium. When reading Homer's Iliad at the high school in the '80s it seemed a fairy story, but not far from the entrance to the Dardanelles, on the right-hand side one could see the debris from the excavations which showed that Troy was a real place.

We passed the town of Gallipoli at 1.45 p.m., and soon were on the Sea of Marmora. From Gallipoli to Constantinople at the other end of the Sea of Marmora the distance is 130 miles and we arrived there about daybreak on Monday, May 11.

#### In Constantinople

Turkish police came on board and we arranged for our visas, paying £2.01 (Turk.) for each passport. A Tokathian Hotel porter was also on board and he undertook to get us from the ship to the hotel. First, we rowed to the quay and put our luggage on the table for customs inspection. Next, we loaded the bags in a one-horse carriage, which was then boarded by the porter, us four, and a Miss Edison, who spoke French for us. She was in the employ of the Refugee Committee for Near East Relief in Greece and was on a holiday. The cost was £15, plus £4 for the porter. The hotel was pretty full but we got two double rooms with bath for £16 = \$8.80 each. In all my travels this was the only hotel where, in



the bath attached to the room, there was a separate special bath for the feet. We first thought that the price included our board—not so. However the meals were not very expensive.

Having "got settled" in famous Constantinople, we had lunch at the hotel. Then we visited the Lloyd-Trestino office and verified our berths on the ship Semiramus, which in three days was to carry us forward on our journey. After this we did some modest exploration not far from the Grande Rue de Pera, on which the hotel was located. Among other things I found a book-store which had on a shelf a large selection of Stephen Leacock's books.

### Seeing the Sights

As Constantinople had a population of a million, and a large number of remarkable features, we arranged through the concierge of our hotel for a guide to drive us around the city on the following day. He was to pay all admissions and tips; the inclusive price of all was £22.

At 10 o'clock, Tuesday, May 12, we started out in a big German car, with Mehmed Rechid Bey as guide. We went first to the Sophia Mosque, the most famous of all the buildings in the city. Here was erected by Constantine in 326 A.D., a church dedicated to Divine Wisdom (<sup>to</sup> Soph<sup>ia</sup>), which after a fire in 415 was rebuilt by Theodosius II. After a second fire it was re-erected by Justinian, 532-7. It has had a thrilling history through the centuries and it has preserved a strange sacredness to both Muslims and Christians.

Next, we visited the "Underground Palace", the vastest of the underground cisterns<sup>rooms</sup>. The roof is supported by 336 columns, in



28 rows, 12 ft. apart, each crowned by a finely-wrought capital. This dates back to Constantine. By a stairway we were able to go down into this great cistern, which was illuminated by electric light and could be explored in a row-boat. While we were down below someone from the surface above let down a pail to draw some water. It looked as if the construction had been undertaken by public subscription, as almost every column bears a separate name, perhaps that of the donor.

At 2 p.m. we started out again. We went to the Seraglio. It occupies the site of the oldest part of Byzantium which was at the zenith of its prosperity about 550 A.D. Mohammed II in 1468 erected his summer palace here. Suleiman the Great (1520-66) enlarged it and made it his residence, and here all the sultans resided until 1850. The railway was built through the gardens in 1873. A very famous and very useful part of the city! Further, from it there are marvellous views over the Sea of Marmora, the Golden Horn and the Bosphorus.

Next we went through the Great Bazar, another of the outstanding features of Constantinople. For a souvenir Jean wished to buy a table runner, and for it the merchant asked £10. After a spell of bargaining or haggling, and a threat to leave, he took £4 or \$2.00. We asked about attar of roses, which he said he could supply, but in this case there was no haggling. For a few cubic centimetres in a tiny vial £2 was asked and no reduction would be considered. In the course of time the perfume was used up, but after 27 years (in 1852) the little container remains sweet, as does the memory of our visit to the Grand Bazar with its many little domes.



<sup>13</sup>  
Wed., May was overcast with a cold N.E., wind, which I learned was rather characteristic of the place.

First we went to the Galata Tower, an old landmark. But to get to the top of it demanded the climbing of 215 steps which no one (but myself) was willing to undertake.

Then we went by steamship up the Golden Horn. This is an arm of the sea  $4\frac{1}{2}$  miles long and <sup>half a</sup>  $\frac{1}{2}$  mile across at its widest place. It forms one of the finest natural harbours in the world. There are picturesque Oriental scenes along both banks, and at Ezub, EYU the end of it, there is a famous mosque. A smaller power-boat can take one  $1\frac{1}{2}$  miles farther to the so-called Sweet Waters of Europe, a popular holiday resort; but we did not take the trip although the name was intriguing. We stopped 15 minutes and then returned. Always there were seen on the Golden Horn crowds of people and much shipping from all parts of the world. There were many things in Constantinople which we had to leave unvisited, but the wonderful landscape was always before us. The situation of Constantinople has been admired in all ages.

#### On to Athens

Next morning (May 14) we left the hotel. We went in a bus to the dock and our 'guide' who drove us round the city helped us through the confusion. There was a big crowd, many being Greek refugees. I learned that in two months all Greeks had to be out of Turkey. It was unnatural and inhuman on both sides. In the customs house there were great cases of merchandise, machinery and bedding mixed with trunks and suitcases, all in disorder. We paid £2.50 to porters and £2.50 to the man who helped us through.



At last we got on the Semiramis, about 12.30, and found our cabins, which were clean and comfortable. The ship left at 2 o'clock and at once speeded up. The view on leaving was charming and I tried a photograph of Serai Point with the mosques. In the afternoon rain fell but that did not affect the progress of the ship. The food was good, but the bolster (a life preserver) under the pillow was rather hard! We passed over the Sea of Marmora, through the Dardanelles and were due in Piraeus, the port of Athens and five miles from it, at 2 p.m.

Friday, May 15. Actually we reached Piraeus (pop. 71,500) about noon. The ship went into the inner harbour, but the officials did not come on board for a considerable time, and for safety the tug Jupiter pulled us out again. At last we moved in once more and police officers came aboard. Our passports were passed without delay, but no one was allowed off until all had been examined.

A fleet of boats had gathered to take the passengers ashore. A man in one of them shouted "Hotel d'Angleterre"<sup>(Athens)</sup> and my friend Will called to him. He conducted us through the customs and I think my passport was examined four times. An accurate list of all entering the port was kept. Then we got into a big old passenger car and our<sup>^</sup> luggage was tied on. The first part of the road (in Piraeus) was rough and full of holes and a detour was almost as bad. The people and the way they lived did not impress us favourably, but the latter part of the road was good.

We got off the Semiramis about 2 p.m., left Piraeus at 2.45, and were in Hotel d'Angleterre in Athens an hour later.



Soon afterwards it began to rain and a very heavy shower caused real rivers in the streets. Then at 5 o'clock at a tea room we had toast, bread, cake, tea and "honey of Hymettus" for four, all for 40 drachmas = 80 cents. Then, after consulting our maps, we walked to the Temple of Jupiter, whose few remaining columns we admired greatly. From here we went on to the Stadium which could seat 50,000 people and is all white marble! Dinner at 8.30 .

### Ancient Relics

The next morning was fine and we started out to explore some of the famous relics which display the ancient greatness of Greece. We made for the Acropolis (Castle of Athens). We inspected the Temple of Jupiter again, the Arch of Hadrian, the Monument of Lysicrates, the Theatre of Bac<sup>ch</sup>us, the Odeion of Herode Atticus, the Propyl<sup>ae</sup>ae, the Parthenon, the Erectheion, the Caryatides. I thought the Parthenon was wonderful, and the Caryatides peculiarly pleasing—indeed they were all impressive. They need no praise from me.

Athens (pop. 167,000) was somewhat fuller on account of the influx of refugees, who were accommodated in the Old Palace, the Zappeion and other public buildings, as well as in temporary huts and tents.

In the afternoon we went to the Acropolis again, and got to the Acropolis Museum just as the rain began to fall. This over-supply of rain <sup>we</sup> were told was unusual. The museum was erected in 1878 and contains all the sculptures of the Acropolis (except those previously removed). After the rain had ceased we walked down hill through the "old town", past machine shops on a narrow street, and at last found the Theseion, the best preserved of all the ancient



Greek buildings.

Sunday, May 17—More rain

In the morning we took a taxi to the National Archaeological Museum. There were many fine things in it, but the room of the Mycenaean Antiquities (B.C. 1500-1000) pleased me most. They made Agamemmon live again. It closed at 12 noon and the rain was still falling, and we took a taxi to the hotel. The rain ceased at 3 o'clock and at 3.30 we engaged another taxi. The driver had spent six years in Boston and spoke English, though hardly with the Bostonian accent. He returned to Greece in 1912. He drove us along the main Stadion Street past the chief shops, then past the Parliament House, the University buildings, the Tower of the Winds, the old Market, the Cemetery, the old Palace, to the Stadion. There was to be a grand fete at 5 o'clock, but on account of the rain it had to be postponed.

We had tea at the Zappeion Restaurant, where a band was playing good music to a big crowd.

Then I visited the Temple of Jupiter again. Originally there were 104 huge Corinthian columns, of height  $56\frac{1}{2}$  feet and diameter 56 inches at the top, 67 at the bottom. I walked around the enclosure, the original stone wall was still there! Fifteen of the columns still existed. One of these was lying prostrate on the ground and its various sections were separated. I could see how they were joined together to prevent slipping. Now the fluting of the columns is perfect and I wondered if the fluting was done after all the sections had been put in place to form the column.



Home through Hadrian's Arch and dinner at 8.30 again.

Farewell to Athens—Monday, May 18

To recall our visit we laid in a collection of photographs of Greek subjects. I wanted prints 6x8 or 8x10 inches, but they were usually larger. Very good and very low in price.

We had lunch at 1 o'clock, and at 2.45 left the Hotel d'Angleterre for Piraeus in a fine new Cadillac car. On the way it ran out of gasoline. The driver jumped out and a passing Ford car took him on to a filling station. He was back in 15 minutes with some gas; but it was just as well that we had ample time.

At last we reached the customs house at Piraeus and engaged a porter. Being British our luggage was not opened and we did not require special exit papers. Our passports were simply inspected and passed. We got on board the S.S. Asia about 4.15. The head porter demanded 100 drachmas but we gave him 80, the same as we had paid before, and told him he was a robber. He cheerfully said "good-bye" and left at once!

Our staterooms, 80 and 81, were large and clean, each with two port-holes. Afternoon tea at 4.30 and dinner at 7 o'clock.

Next morning we rounded Cape Matapan and, recalling my public school geography, I took a photograph, although there was little to see in the haze. We were opposite the L.H. on Cephalonia at 10 p.m., and on Wednesday at 5.45 a.m., we dropped anchor off the town of Corfu. From Piraeus to Corfu, 370 miles. This appeared a good-looking town (pop. 28,000) with a fortress at each end of it. Natives came aboard and I changed 1100 drachmas at the rate of 425 lira for 1000 dr. Also, I bought an olive-wood walking-stick for 10 lira



(50%) with KEPKYPA, the Greek name of the island, carved on it.

We started again at 11 a.m., and passed through comparatively narrow passages, past lights and buoys, suggesting Georgian Bay, and at last got into the Adriatic Sea. We reached Brindisi at 8 p.m., and in about an hour the health authorities allowed us to land. We entrusted our baggage to a Cook's man and soon it was through customs and we were on the way to the Grand Albergo International, where we secured two rooms and we were in bed at 10.30. We were awakened at 3.50 next morning after being bothered by mosquitoes, had breakfast at 4.30, during which Cook's man appeared, and at 5 o'clock we went to the station. We bought four 11 cl. tickets for Naples, 240 miles, for 124 lira (about \$5) each.

We left at 5.45 a.m. (Thurs., May 21), quite comfortable. We had the compartment to ourselves half of the way. I observed that the 'guard' had a pistol at his belt, and I noted that there were 'civil guards' at the stations and also on the train. The trip began to be tedious about 3.30 and we were glad to reach Naples at 6 p. m. We got our baggage out and on a bus bound for the Hotel Metropole.

The country near Brindisi is rather flat, but fertile and well cultivated. There were fine farms and good gardens. Then the land became lighter, with less growing on it, and for some distance we ran along the sea coast (Gulf of Taranto). After this the route approached the mountains and we went through many tunnels. As we approached the west end of our journey Salerno, Vietro and some other places were very beautiful. The land for the last twenty miles seemed one continuous garden. There were many loquat trees as well as vines



(which we expected as a matter of course). Olive trees appeared more numerous earlier on the route.

Friday, May 23., a Ford Car.

First we went to Cook's and got letters from home. All well! Bessie was to give her paper on Asthma before the Ontario Medical Society on May 8.

When planning our long tour we proposed to buy a second-hand Ford car in Naples and to use it for all our transportation in Italy, France and England, and then dispose of it before sailing for home. So Will and I went to see Fracastri, the chief Ford agent here. He did not have a single Ford car on hand! He would like to sell some other make. No other dealer had a Ford car for sale, and all wanted to sell an Italian car--at a price we would not pay.

Next, we tried to engage some person to drive our party of four to all the places we wished to visit in Italy. The negotiations were carried on through the Royal Automobile Club. We received an offer, but when we were about to accept it the rate was doubled!

Naples, Vesuvius and Pompeii

Naples we found to be a big modern city with half-a-million population, but it had many narrow crooked streets, too. Its situation is beautiful, next to Constantinople in picturesqueness, we thought.

One of the first attractions we visited was the Aquarium, which was not far from our hotel. It was in the central building of the Zoological Station which was founded in 1870 by the German naturalist Anton Dohrn (1840-1909). It is famous throughout the world although it is not so big as that in New York, nor does it have such showy specimens as that in Honolulu.



But the two greatest attractions of Naples are the nearby crater of Vesuvius and the excavated city of Pompeii. These we visited on Saturday, May 23.

First we went by electric railway to Pugliano, where we changed to Cook's special line  $5\frac{1}{2}$  miles long to the <sup>m</sup>summit, first by friction cars, then by cog-wheel and finally by cable cars. An easy walk of quarter of a mile brought us to the crater which was belching up smoke and occasionally red-hot stones and ashes.

We had lunch at the Eremo Hotel, which is near the Vesuvius Observatory and returned to Pugliano.

Taking the Pompeii visit there were 12 or 15 persons, in charge of two guides. We reached Pompeii at 1.20 p.m., and had an intensive visit of three hours. The ancient houses with their original decorations, the forum, the theatre, the gladiators' barracks, the ruts in the pavement worn by the chariot wheels—they were all very real and extremely interesting. The little city of Pompeii was overwhelmed with volcanic ashes in 79 A.D. We left Pompeii at 4.23 and reached our hotel at 5.30.

Next morning we spent three hours at the National Museum where our chief interest was in the objects from Pompeii and Herculaneum.

#### Tuesday, May 26—On to Rome

We went in the bus to the station and purchased II Cl. tickets for Rome, 162 miles. We had the entire compartment. It was a fine day, after considerable rain; the country was well cultivated and beautiful. Reached Rome at 1.30 p.m. In a taxi we drove to Gerardet Pension, Piazza S. Maria Maggiore, where we secured rooms for our six-day stay.



### The Many Attractions of Rome

First of all, we walked to the Coliseum. We were astonished at its size—615 ft. long, 510 ft. wide,—elliptical in shape. It was inaugurated by Titus in 80 A.D. and could accommodate 50,000 people! We had been accustomed in Toronto to the use of travertine for floors or the inner walls of a high-class building, but in this enormous structure it was used throughout.

Next morning we went to the Rospigliosi Gallery and the Vatican Museum. We were greatly impressed with the latter, especially the sculpture, although the picture gallery had many famous works. In the afternoon we visited the Appian Way, the Coliseum again, and the Catacombs of St. Calixtus.

On Thursday, May 28, we went to the Pantheon, where are the tombs of the Kings of Italy, of Raphael, and of other famous men; and to the memorial to Victor Emmanuel II, and the Tomb of the Unknown Soldier on which at that time children were placing a wreath.

Then I called at the Canadian College, to the Rector of which I had a letter from Archbishop McNeil of Toronto. The Rector was not in. I went back at 1.45 p.m.; he was asleep. I left the letter for him. Then Jean and I went to St. Peter's and saw bands of pilgrims parading; this was in 1925, which was a jubilee year, and we were greatly interested.

On Friday we saw the Forum, the Palatine Hill, Caracalla's Baths, the Garibaldi Monument, St. Peter's again, the Pincio Park and the Piazza del Popolo.

On Saturday we went to the National Museum. There was much to interest us, though nothing of the highest artistic value.



Many of the objects were found in excavations in Rome during the last fifty years. Then I went to the Vatican to locate Father Hagen, a widely-known astronomer, but I was not successful. I understood he was attached to the Vatican Observatory but I could not even find it. The place was swarming with pilgrims in their odd national costumes, and my lack of a knowledge of the Italian language was against me.

Sunday, May 31—My 60th birthday, and in the Eternal City! Jean and I went to the American Episcopal Methodist Church, 38 Firenze St., at 11 a.m.—accompanied by Miss Sanford of Galveston, Texas, who was staying at our pension. There were not many present but it was an interesting service. We signed our names in the Visitor's Book. Present were also Rev. W. Walkinshaw and wife; he wrote monthly for The Christian Guardian (Toronto). The church was on a business street in the lower story of a business building. The preacher was J. . . . Maynard and his address was straightforward, simple and earnest.

In the afternoon we visited the lovely Pincio Garden where we had tea—on our last afternoon in Rome.

To Florence, Monday, June 1

From Rome to Florence the distance is 196 miles, in the north-westerly direction. We left Rome at 9.45 a.m. and arrived at Florence at 3.00 p.m.

On the way haying operations were in full swing. In some fields 20 or 25 people, male and female, were working. The hay was cut with scythes, but raked up with horse-rakes. At one place I saw a mower, but not in operation. The land, as a whole, is well cultivated. There were many olive trees and vines. The trees are set out and kept trimmed down. The vines are planted near the trees



and climb up them and sometimes run from one tree to another in beautiful festoons. I doubted the wisdom of this arrangement. The trees will take some of the richness from the soil which might go to the vines, and the climbing of the vines on the trees will interfere with their growth.

I also noticed great cement basins full of water for the women to wash clothes in! Nearer Florence the washing was done in the stream. Our pension in Florence overlooked the River Arno.

### Florence Famous in Art and Science

Florence is a great modern city of about 250,000, and has been famous for many centuries for its art and science, in particular being the scene of Galileo's investigations.

We went to the great Cathedral--big, cold, austere! Service being carried on within a glass enclosure. Not much harmony in the music; but behind the altar was Michael Angelo's "Descent from the Cross" (1555). The Campanile (292 ft.) was said to be the finest bell-tower in Italy. The Baptistery, right near our pension, had the Roman style in its columns, pilasters and windows.

The Uffizi Gallery, we were informed, was the most important collections of paintings in Italy and one of the greatest art collections in the world, but we could give it only a brief visit.

We also went to the Pitti Gallery and in the wonderful collection there we noted paintings by Rafael, Andrea del Sarto and Murillo.

### Tracking Galileo

Galileo (1564-1642) was of an old Florentine family, but was born in Pisa. Here he studied medicine and then he was professor of mathematics, 1589-91, at the same place. From 1592 to 1610 he was professor at Pad<sup>va</sup>, and then left Pad<sup>va</sup> for Florence in September 1610.



For the next seven years I did not know just where he lived but apparently, it was in the hilly portion of the city south of the Arno River. In the Costa San Giorgia, easily reached from the <sup>c</sup>Ponte Vecchio, house number 11 is "Galileo's House". The street is a narrow one between stone walls and climbing the hill rapidly.

On the afternoon of the same day I took the tram to the Piazza Michelango, a little farther up the river. This square has an elevation of 340 ft. and is a magnificent view-point over the city and surrounding country. From here I walked along Viale (alley) Galileo and was interested to see the rows of horse-chestnuts along it. Just before reaching the circular Piazzale Galileo the viala crosses the Via di Arcetri, and turning left on this street I began to climb. I passed the Royal Observatory with its tower telescope and went on to the long street of the village. On it No. 29 was Galileo's House; here from 1631 to 1642 he lived<sup>d</sup> practically a prisoner. Here he was visited by Torricelli and Milton. Retracing my steps, I got back to Viale Galileo, and continuing on it and Viale Machiavelli, I reached Porta Romana, from which the Via Romana took me directly to Ponte Vecchio and home.

In the suburb Bellosguardo, west of Porta Romano, Galileo occupied the villa L'Ombullino in the interval 1617-31.

In the Museum of Natural Science there is a section devoted to Galileo, including a fine statue. Here I saw his original telescopes and several contemporary telescopes, an original thermometer, astrolabes, sundials and other instruments—all most interesting. There were busts of Torricelli, Viviani and others. Also, I saw four hollow spheres (three of zinc, one of copper) used to test the compressibility of water.



On to Venice, Friday, June 5

There was much still to be seen in beautiful and historic Florence, but the time had come to move forward. Our companions decided to go by motor-bus to Bologna and left at 6.30 a.m. Jean and I took the railway at 10'oclock. We reach Bologna at 1.20 p.m. after much mountain climbing and some long tunnels. The scenery was wonderful. At Pistoria, early in the trip, a pony engine was attached at the rear to push us up the hills.

Finally, at 4.50 p.m., over a long viaduct, we reached Venice (184 miles). The luggage was loaded on a truck which conveyed it to the end of the station platform which was on the bank of the Grand Canal where the public gondolas were drawn up. We two and our three pieces of luggage were put aboard one of the gondolas and taken to Casa Petranca, where we obtained rooms for ourselves and our two friends who had not yet arrived.

We got settled at 5.30, and as dinner was not until 7.30 I went for a walk along the Grand Canal to the Rialto Bridge. I explored the market, the bridge, and some of the side-streets on the other side of the Canal. We were at the dinner table dawdling until the arrival of our friends' train which arrived at 8.40. We were glad to be together again!

Venice

To me Venice was always the wonder-city of the world, where the streets were canals upon which one glided along in a graceful gondola. By reading its history, reaching back 1500 years, one can understand how it evolved into its modern form, but no attempt at explanation could remove from me the feeling of strangeness--almost of unreality.



The city rests on an archipelago of 117 islets, it is  $2\frac{1}{2}$  miles from the mainland, and  $1\frac{1}{2}$  miles from the open Adriatic Sea, whose force is broken by the natural breakwater known as the Lido.

#### Piazzzi di San Marco

Next day (Sat., June 6) we took steamer (equivalent to tramway) to St. Mark's Square. It was wonderful. There were great crowds and as usual the pigeons drew much attention. Jean got some corn to feed them, but they would not light on her to take it from her hand. However when the regular photographer there shook the corn in a tin vessel the birds would pile on the visitor to get something to eat. But they would not do this for a stranger. A couple of days later we were at St. Mark's again and I gave more corn, together with my camera properly focussed, along with a silver coin, to the photographer, and he made an exposure with it. The picture showed the birds on my hat and on Jean's arms—a pleasing souvenir of the place.

We visited the Cathedral. The influence of the mosque and the oriental colouring were very evident. We ascended the Campanile, which is 325 ft. high. On July 14, 1902, without warning, it collapsed, but by a world-wide subscription it was reproduced exactly as it was before. It was opened to the public in 1912.

The Doge's Palace is also famed in history and we examined it. Also, the bronze horses on the facade of the Cathedral drew our attention. They are a Greek work of Alexander's time or soon after; and as booty of war came from Constantinople in 1204. In 1798 they were carried by Napoleon to Paris, where they remained until 1815.

#### Italy a Nation

On Sunday, June 7, there was a big celebration of the day



when Italy was granted a constitution in 1861, combined with the 25th Anniversary of the beginning of Emmaneul III's reign. We reached St. Mark's too late to see the celebration. There were many flags and banners still to be seen, but the crowd was breaking up and the band marching away.

Jean and I went across to Punta della Salute and located Casa Struan, the house of Rev. Alex. Robertson, where a Presbyterian service was held. Rev. and Mrs. Walkinshaw, who had been at the service in Rome, were here also, and he read the second lesson. About fifteen were present. The minister took as his text the last verse of II Corinthians and spoke on the Trinity. He also referred to the present anniversary and spoke well of the present King of whom he had written a biography.

We went twice to the Lido. It was much like taking the ferry to our island in Toronto. On the first occasion the day was cool and no one was in swimming; on the second it was a fine day and we took a drive about the island. It is the most fashionable sea-bathing resort in Italy. Many fine residences and literally miles of bathing-houses arranged in three rows, one behind the next, parallel to the shore. Many were rented by the week or the month to the citizens. Then we had tea at the Stabilimento, upon the fine beach. It was all very pleasant, and we went home in a vaporetto (little steamboat).

#### On to Milan, Wednesday, June 10

We were sorry to leave charming Venice. We had breakfast at 7.10 a.m. and all went in a gondola to the station. Not very swift but very satisfying! The train left at 8.35 and our compartment was full. It included a theological professor from Princeton and an English unmarried lady-artist who continually got up and walked over



our toes.

I think our passenger coach much superior to the European type. You travel forward; your legs are not against your opposing neighbour; you don't stare into his face; there is better circulation of the air; and there is a more economical use of space.

But the service was excellent. The distance from Venice to Milan was 162 miles, almost directly west, and the fare was 88.10 lira or about \$3.55. We arrived at 2.05 p.m., five minutes late. The country was pleasant all the way. That near Milan was a level plain, apparently with too much water, which they were endeavoring to get rid of.

#### The Great Cathedral

Having secured rooms in the Albergo Bella Venezia, we set out to inspect the famous cathedral. It is very imposing, with its immense size and its numerous pinnacles and carved figures. There are 135 of the former and 2300 of the latter and they actually suggest a small forest of fir trees! There is also a spacious piazza before it to show it off. The building is constructed of a stone resembling granite but is encased throughout with white marble.

The architecture is said to be badly mixed, which one can understand when one learns that it was begun in 1386 under an unknown architect and was continued under ten others; and, to cap all, the upper portion of the facade was added by order of Napoleon I, and it is not considered very successful. But the general effect is impressive. The stained-glass windows are the biggest in the world and are of very good quality.

Mil<sup>3</sup>on had a population of some 800,000, second only to Naples, and was distinguished for its industry and commerce.



### Visit to Lake Como

Of course we had all heard of the famous Italian Lakes, Maggiore, Lugano and Como, which are easily reached from Milan; and we engaged a private automobile to drive us to Lake Como.

On Thursday, June 11, a closed car called for us at the Bella Venezia at 9 o'clock. First, we drove through the Park and past old fortifications, now turned into a technical and art school. Then by a level road for some miles, through towns and villages, often traversing a single narrow crooked stone-paved street. At several places decorations were up in celebration of Corpus Christi day. At the town of Como (20 miles from Milan, pop. 37,000) a long procession was in progress and I got a 'snap' of it, as well as of the fine monument to Volta, whose name is born by one of the fundamental units of electricity. Como is at the south end of Lake Como. From here we went by a picturesque road along the shore of the lake about twenty miles to Bellagio, which has been described as "a place of voluptuous beauty". We should have been pleased to spend a week among the three lakes.

At 2.15 we started for home by another route. The road was very hilly, with many sharp turns and stiff grades. We stopped twenty minutes at Como to look into its fine cathedral, which dates mainly from 1426, is built entirely of marble and is highly praised. We reached Milan at 5.30 p. m.

Next morning we paid our account at the hotel. Just before leaving the premises I discovered that the office had made a mistake of 100 lira in our favour, and I went back and paid it. "The Direzione" were, of course, pleased; I told them we were from Canada.



To Mentone and Monte Carlo

We left Milan at 8.35 a.m. by express which reached Genoa (94 miles) at 12.15. Remaining in the same compartment, we left at 12.30, but the train was much slower. We reached Ventimiglia, seven miles from the border, at 6.20. Here we passed customs and passport officers and at 7.20 we started forward in a French train. As Mentone is only two miles beyond the border we soon came to it. It is 102 miles from Genoa. We got two carriages and drove to Hotel Stella Bella, whose existence we had learned from an advertisement we had seen in the Daily Mail. It was on the seashore, clean and comfortable. The scenery from Genoa along the shore was very fine. In order for the railway to keep along the shore it passed through many tunnels. Mentone is beautifully situated on a bay with a steep mountain behind it.

Next day (Sat., June 13) we walked about the town (pop. 10,000) but it was very dead as the "season" was over. At 2 p.m. we took the tram for Monte Carlo, five miles west along the shore. The scenery was charming. Palms, geraniums and other flowers, were in great profusion. After looking about the town (pop. 3800) we went into the Casino, admission 5 fr. each and presentation of passport. There were 6 or 8 tables, all full but one--which we did not occupy. There were no thrills observed; it seemed a quite blasé performance. We said good-bye to Monte Carlo at 6.20 and got back to our hotel at 7.00, in time for dinner.

To Marseilles, 156 miles

We spent one more day admiring the scenery around Mentone and then left for Marseilles. A lunch was put up for us at the hotel, and the proprietor told me that his accommodation was



practically "taken" from September next. Our train departed at 10.28 a.m., and we had the compartment to ourselves nearly all the way. The first part of the trip—to Nice (19 miles) and beyond—is very beautiful, with a considerable number of tunnels, but afterwards the road was away from the shore.

We arrived at Marseilles at 5.15 p.m., and took the bus for Hotel Bordeaux et d'Orient and obtained rooms. The proprietor did not remember our last visit (March 23) when we arrived after midnight and he eyed us suspiciously. It was noisy at the hotel. The heavy trucks went on low-gear up the hill on Boulevard d'Athenes and, also, the wagons ran over the cobble-stones and made a great noise.

#### Trip into Provence

We had decided to make an excursion into that part of Southern France known as Provence, and Will and I went to see a garage man near by, recommended by the proprietor of our hotel. We arranged for a 3-day trip in Provence at 2½ francs per km. ~~and~~ 30 francs per day to the chauffeur.

Before starting out next day we went to the office of Messageries Maritimes, by which we travelled from Marseilles to Alexandria in March. This Company had agreed to issue tickets at half-rate to delegates who were to attend the Congress in Cairo. To my friend Will and me this reduction was given but not to our wives. To secure it we were told that we would have to present a written statement that they were members. Now, three months later we had the evidence. The man I interviewed took the letter containing the evidence to a neighbouring desk and then came back and said they would not <sup>make a return</sup> unless I supplied a letter saying that the women



participated in the proceedings of the Congress! We told the man that the company did not honourably keep its promises and indignantly left!

We then started on our excursions. We passed along the valley through Rove and through Ensues, and noted the long and high masonry bridge near Garry, and reached Martigues at 12 o'clock. This is a favourite resort for artists. Starting forward at 1.45 p.m., we went to Montmajour Abbey, a big ruin on the top of a hill, then used in part as a stable and a dwelling. When exploring about I found a carob tree and got some "husks which the swine did eat". Then we went on to Les Baux, an immense mediaeval castle, built chiefly out of the solid rock. Then back to Arles (pop. 29,000) on the Rhone and put up at the Hotel du Nord, which was built so as to use a part of the old Forum. The Forum and the Arena were still actually used on Sundays for bull-fights.

Next day (Wed., June 17) we visited AlysCamp (Champs Elysées) where the sarcophagi from a famous cemetery have been collected along the roadside. Then on to Aigues Mortes (25 miles s.w.) a town of 4500 population where the old walls surrounding it were still complete!. After this we drove northward to Nimes (pop. 80,000) which we reached at 12.30. After lunch we visited the Arena, the Maison Carree and the Park. The ruins date from the 1st. Cent. A.D. and are very perfect. Then we went to view the noted Roman aqueduct, the Pont du Gard, (20 A.D.) a wonderful and noble piece of work. It is part of an aqueduct 26miles long and 160 ft. high. The little river Gard flows beneath it.

Then we drove on through pleasant country to beautiful Avignon on the Rhone. We visited the Palace of the Popes and the lovely



promenade adjoining it, where is the finest "soldiers" monument I have ever seen. We stopped at the fine new Dominion Hotel which had been opened Dec. 24, 1924, only six months before.

Next day we started on the return to Marseilles. The driving was pleasant and we noted the ever-varying directions of the roads, demanding persistent inquiries lest we should go wrong.

#### Fountains of Vaucluse, Aqueduct of Roquefavour

I noticed the numerous fine houses and also the beautiful avenues of trees. We came to Vaucluse, near which was a big undershot water-wheel; and, soon after, to the well-known and impressive Fountains of Vaucluse. There were extensive paper mills near by—also special places for women to do their washing, always in cold water, with much labour!

At Aix-en-Provence we had lunch and visited the famous Thermal Establishment, with water varying from 93 to 97°F. Some of the substructures of the Roman baths were still to be seen. Then we went to see the famous Aqueduct of Roquefavour, 9 miles from Aix. It is a marvel of modern architecture, built 1842-47. Its length is 430 yards and height 270 yards, which dimensions are much greater than those of the Pont du Gard. This aqueduct is part of the Canal de Marseille, 57 miles long, conveying water to Marseilles and some nearby places. Standing at the end of the aqueduct one was impressed with the mighty flow of water. Then we drove past the reservoir into which the water violently rushed. We reached Marseilles at 5.30 p.m., greatly pleased with our excursion.

#### Good-bye Marseilles

Next day (June 19) we walked to the dock at the Vieux Port and saw the little ferry-boats which ran every half-hour to Castle d'If, two miles out from the harbour. The Castle was made famous



by Alex. Dumas in his "Count of Monte Christo".

In the afternoon we went in a charabanc to see the city. It had a population of over 500,000 and was the principal sea-port of France. There were many fine streets, but I think we enjoyed most the Corniche Road and the Church of Notre-Dame-de-la-Garde on the high hill to the south of the harbour. Inside the church many little ships were hung up and tablets were mounted all about the church recording blessings which had been received.

### On to Paris

On Saturday, June 20, at 9.30 a.m. we left for Paris. The distance was 535 miles and the fare 174 francs = £8.60. At 11.30 Jean and I had dejeuner, which lasted an hour, costing 35 francs. Nothing like it on our trains!

We passed through much pleasing country. The hay had been cut at some places and grain at others. In a change of 7° of latitude I suppose one might expect such a variation. The hay was being "taken in" by the inevitable cart. Occasionally one saw a 'binder' but sometimes a plain sickle was used to cut the grain.

Paris was reached at 9.55 p.m., on time, and after a little delay we drove with our luggage to the Palais Royal Hotel, on rue de Valois, and were given the rooms which had been ordered for us by telephone from Marseilles.

### Twelve Days in Paris

Our hotel was very convenient to the chief attractions of Paris. We made several visits to the Louvre and admired its store of Treasures. Of them all I think we liked the statue of Venus de Milo best. It was discovered by a Greek peasant on the Isle of Milos in 1820, but probably is a work of the 2nd century B.C.



The Luxembourg Gardens and Museum were very attractive, with their fountains and statuary and their specimens of modern art. It is also of great interest historically as the seat of the Senate of the Republic.

One evening we went to the Madeleine Cinema, and one of the films was a picture of a Spanish bull-fight. To us it was disgusting. When about two-thirds through I was pleased to hear hisses and the tramping of feet. Six bulls were killed! At 10.10 began the main piece, La Mirage de Bonheur, a south-sea story described as a dramatic comedy but which was a painful tragedy. Tastes differ! Out at 11.30.

On June 28, we went to the Canadian Commissioner's office on Avenue des Capucines and there had the opportunity of reading The Toronto Globe for June 11 and nearby dates. These contained an account of the organization meeting of the United Church of Canada.

Then I walked to the Conservatoire des Arts et Metiers to see Foucault's Pendulum by which he demonstrated in 1851 the rotation of the earth. There it was, still swinging, but I decided that it was not the original apparatus used in the Pantheon. It was rotating on its axis, also, and the motion was slightly elliptical. There were many other interesting exhibits, showing well the fertility of the French scientific mind.

It had been announced that on the following day the Fountains at Versailles would play. So we joined the crowds going to this great show. This is a beautiful and historic place. The water was turned on from 4.30 to 5.15p.m. On the return the train took 1½ hours to go 11 miles.



### Chateaux on the Loire

On June 30 we made an excursion to the famous chateaux on the Loire. At 6.25 a.m. we went in a taxi to the Gare du Quai d'Orsay where we took the Paris-Orleans railway to Blois, which is 112 miles S.S.W. from Paris. The country we passed through was much like 'old' Ontario but was more fully cultivated. We saw several self-binders.

On reaching Blois we engaged a motor to drive us on our trip. First we went to the Chateau at Blois, which had a famous spiral staircase. After lunch we went to Chateau Chambord, which belonged to the last Bourbon heir to the French throne (1820-83). We saw his state carriage and his bed—which were never used.

Then to Cheveney, not so grand and occupied; then to Chaumont-sur-Loire, occupied by the de-Broglies. Each of these chateaux had its own distinctive architectural features and its own place in French history. We were back at Blois at 6 o'clock and left for Paris at 6.59, but the brakes on the train went wrong and we were an hour late in reaching home.

We had several trips on the river Seine. We passed under the numerous bridges, each of its own distinctive design, and the busy tugs, scows, and steam-shovels showed how busy the city was and what great use it made of its little stream.

### In the Bois de Boulogne

On our last afternoon in Paris Jean and I went for a drive in the Bois de Boulogne. I remembered the old song "Rosalie" in the University of Toronto Song Book

"I ride in the Bois in my little coupe,  
And I tell you I'm something to see."



and I wanted to do the same.

I tried to get a chauffeur who spoke English but, after three failures, came to one who could speak German—also Russian, as he came from Riga. We went along the Champs Elysees, from a distance seeing the flame at the tomb of the "Unknown Warrior", buried under the Arc de Triomphe. It seemed a naked flame, like a spirit lamp. We drove along the Avenue du Bois de Boulogne into the Bois. It is a wonderful park. We went past the two lakes, on which pleasure boats were moving about; past the Longchamps and Auteuil race-courses and past the Jardin d'Acclimatization. Then along the Seine, past the Barrage and the Polo Grounds. Then we crossed the river and went along the left bank, past the Eiffel Tower, the Exposition, along Quai d'Orsay to Pont du Carrousel and home.

A happy finale!

#### Paris to London

Next day, Friday July 3, we crossed the Channel. Our route on this occasion was via Boulogne and Dover. We left our hotel for the Gare du Nord at 7.40 a.m. The train made few stops and reached Boulogne at 11.17. The French customs were soon passed and we got on the steamer "Maid of Orleans", which was crowded. With a calm sea we reached Dover at 1.15 p.m.

The train for London was in two sections and we took the second one which left at 1.45. The route ran along the south coast, through several tunnels, across to Folkestone Junction and then north-west to London. There were several long tunnels in this portion and we got to London at 3.35. We drove to 5 Endsleigh St., and secured rooms, but only for the week-end. Then we had afternoon tea and while at it I felt in my inside coat pocket for my wallet—and



it was gone!

The last occasion when I used it was, I remembered, on board ship when I took a £1 note out of it to pay for lunch. I looked all through my clothes and in the room, but it was gone. At first I thought I had laid it down and forgotten it, but as no trace of it, or thought of using it, came to me I decided it was probably stolen. But I did not remember being in a crowd at any time and there was a notice on the top deck of the ship, "Beware of Pickpockets". In the wallet were a £1 note and four or five "shinplasters", (little Canadian 25¢ notes) and besides that only photos and odd "clippings" of no value to anyone else, but which I did not care to lose.

Next day I wrote to the Purser of the ship asking him to search for the wallet. Also I put a "Lost Article" advertisement in the Evening News. I feared I was throwing 6 sh. away but I did not want to reproach myself later. In addition I went to the Lost Articles department of Scotland Yard. They said that if stolen it might, after anything of value had been taken from it, be dropped into a P.O. pillar box and then be sent to their office. They suggested that I call again two days later. I did so, it was not there.

I shall finish my story here. We reached home in Toronto on September 21, and when I went to my office at the University my assistant handed the wallet to me! It had been sent by the London P.O. The money was taken but nothing else.



CH. XXI

THE MEDITERRANEAN

(5) Two months in England

Meetings in England of two important scientific organizations in which I was interested were to be held during the summer, and I wished to attend them. One was the international Astronomical Union which usually meets every three years. This gathering was to be at Cambridge from July 14 to 22. The other was the British Association for the Advancement of Science which meets annually and this year was to be at Southampton from Aug. 26 to Sept. 1. Our date of sailing for home was Sept. 12.

A Ford Car

There was a dull sky and threatening rain on Saturday, July 4, as on so many days. In the afternoon Will and I went to Tuston Road to inquire for a Ford car, and we located one at Hayes's, No. 335. The price asked was £50, with a promise to pay back £35 if returned in good order in September. It was surely a good offer if the engine was any good. We made a further search, but desirable used cars seemed scarce and we agreed to take it.

London Attractions

To celebrate our arrival in England we went in the evening to the Stoll Picture Show on Kingsway. I noticed that on the building was "London Opera House". Only 3/6-seats were left and we four filled a "box". The show was good but pretty American. "Love's Wilderness", was a combination of Ile de Diable and a Canadian farmhouse—rather unreal but well produced. Then "Pampered Youth", I think from a story by Tarkington, was well done. Clean and thrilling. Runaway horse, automobile accident and very realistic fire in a rooming house! Some comics and news items, a reputable soprano, a good orchestra and a full



house!

On Sunday Jean and I went to the West London Mission in Kingsway Hall. I think it was organized by Hugh Price Hughes, and his widow was head of the sisterhood. The preacher was J.G. Bickerton, D.D., and the service was simple and helpful. Rt. Hon. Walter Runciman, M.P., was one of the Circuit Stewards. There was sacrament at the end but we did not remain.

In the afternoon we all went to the Wallace Collection in Manchester Square. We were impressed with the wonderful treasures—pictures, carvings, miniatures, ivories, bronzes, armour—all of the highest interest.

Then we walked to Hyde Park and heard some of the perennial orators—and were not much edified thereby!

Next morning I called on a dentist on Southampton Row—Dr. Toogood. He found no cavities to be filled, for which I gave him 5/. He told me of numerous quacks in dentistry around there, but said the Act at last had been amended to weed them out—in a generation, perhaps.

Then I went to the Canadian High Commissioner's office at Canada House, Trafalgar Square. There I met Joe McCully, who was inquiring for my companion Will. Joe was at Oxford, and there was a report that he was to be head of a new Friends "Boys" school. He asked if A.S. Rogers had come to England, which had to do with this matter. The project was carried out and the school built at Newmarket. (After several changes, McCully in 1952 became warden of Hart House, U. of T.)

In the afternoon Jean and I went to the Zoo at Regent's Park. We thought it well arranged and most interesting, and a great source of information for children who, among other amusements, were getting



rides on the elephants.

I was impressed with the fine shops and squares of London, but the streets seemed to be crooked and narrow—a contrast to Paris. I had also noted some young people and children not in the best physical condition, and the pavement artists, wandering musicians and other beggars were disturbing to see.

Of course we went to the British Museum. We were specially interested in the Egyptian rooms, also the Elgin Marbles; but we inspected the museum generally and admired what we saw. It was clean and everything was plainly labelled.

On July 8 we visited Westminster Abbey. We were specially affected by the grave of the Unknown Soldier, with the many flowers upon it, and the numerous visitors close up to the simple railing about it. We also inspected the memorials to the scientists, including Newton's fine monument and those of Horrox, Kelvin, Joule, the two Herschels, Stokes and Adams. In the Poet's Corner I thought there were some that hardly deserved to be there.

There were many visitors, including a large number from the Sunderland Conservative Association (Durham County), who came in many charabancs and who, no doubt, were being escorted about the building by their M.P.

In the evening we all went to the Hippodrome. I was glad to be inside a "Music Hall". The attractions were: Winifred Arthur and her Jazz Band, an Irish singer with a good voice, a man with a rope which he continually made to coil around him while he perpetrated good jokes, (I did not know his name but decided afterwards that it was the famous Will Rogers), and a toughly-dressed fellow who danced and walked with most extraordinary steps. This last performer did not utter a word, but he was most amusing with his



antics and was brought back to the platform half a dozen times.

On July 9 we went to the Tate Gallery in the morning. We were greatly pleased, especially with Room XV -- 19<sup>th</sup> century works. We thought some of the paintings and some of the sculptures equal to most of the ancient productions.

Will and I went to Hayes's and paid for the car. We gave £61 for the car and for license fees, which were high in England.

#### Wembley Exhibition

The British Empire Exhibition had been opened in 1924 in Wembley Park, near Harrow, to the north-west of London, and we all visited it. Jean and I went about in an electric chair and saw the various buildings--which were maintained by Canada, C.F.R., C.N.R., The Times, Australia and India. We were proud of our country and interested in them all. We had supper on the grounds and then went to the five-ring circus which we all enjoyed. The elephants, the horses and the acrobats were all very good.

#### Royal Observatory

I also visited the Royal Observatory at Greenwich, and was shown around by the Astronomer Royal, Sir Frank Dyson. I met Jackson, Jones of the Cape of Good Hope, and some others. Dyson pointed out the Thompson telescope, the big reflector and other instruments in active use; and he also drew my attention to their collection of famous old instruments, among them being Hadley's Sextant and Bradley's Zenith tube.

I learned that Sir Robert Falconer, President of the University of Toronto and Dr. H.J. Cody, the Chairman of the Board of Governors, had visited the Observatory the previous day. Dyson was



very cordial and helpful to all.

City Temple and Hampton Court

On Sunday Jean and I went to the City Temple to hear F.W. Norwood preach. On the way we met Mr. and Mrs. E.F. Reid of London, Ont. (London Life) and an English friend bound for the same place. We arrived at 10.35 (service at 11.00), but already there were many in the church. It was interesting to see the ushers keep a central pew free until 10.55, when a woman arrived and walked into it. As there was still much room in the pew, some persons from less desirable side seats were transferred to it. Indeed there was considerable shifting about, as though one seat was much better than other!

The text was, "We count them happy which endure" (James 5.11). He was a good speaker, without a note, but I thought he stressed the pronouns "we" and "them" unduly. The whole service was lively and stimulating.

In the afternoon we made a speedy 15-mile trip to Ted<sup>dl</sup>ington on the Thames, S.W. from London, to visit a Mrs. Chant, to whom we had a letter of introduction from friends in Toronto. I found she was the widow of a Methodist minister and not related to me; and I was interested to learn that her son-in-law was an inspector of Income Tax at Somerset House.

Hampton Court was a short distance farther on, fare 1d., on Bus 127, and we all went there. I first became interested in this place when I learned that Faraday, the "prince of experimenters" (physics and chemistry), spent his last days there (1858-1867). It was a beautiful place. The great masses of flowers, the fine trees and stately avenues, the great vine, the tennis court! It was wonderful. I have never seen such tall horse-chestnut and lime trees.



Trip to Cambridge—Thursday, July 13

Our "Ford Sedan", which was to carry us about England, was brought to our hotel at 11.25. We put our luggage on top, where there was an iron railing, which made us wonder if a taxi-man had been its previous owner. Hayes's man drove us out on the Finchley Rd., and after getting free of the densest traffic he left us, and Will took the wheel. At 12.45 we stopped and on the roadside ate the lunch which we had brought with us. Many cars shot past us and we noticed many picnic wrappings and other rubbish about.

The road was good all the way, without any detours. There were many branch roads, some very crooked, but the numerous road signs carried us along without delay. We passed through Hatfield, Stevenage, Hitchin, Baldock, Royston, Trumpington, and arrived at Cambridge (56 miles) at 3.30 p. m. We soon located 14 Jesus Lane, where two rooms and a sitting room had been reserved for us. Jesus College was near us on the same street, while Sidney Sussex was across the road, being enclosed by a high brick fence.

Cambridge

The population of Cambridge was given as 59,000; and it lies on a flat plain at the south margin of the Fen Country. No where is it more than 50 feet above the sea and thus it has little natural charm. Its great importance is due to the fact that it is the seat of Cambridge University, which includes 17 colleges with 5000 students. These colleges date as far back as 1281. Their buildings have a great variety. Each of them has its own special attractiveness, while the groups and avenues of trees, and the greens and closes and pieces give distinction and grandeur to it all.

Next morning we went to the "office" for the meeting. There was a "star" badge for Jean and me, and various invitations and



announcements were awaiting me. I also got courtesy badges for our companions, enabling them to attend the public functions.

### Inaugural Meeting

In the afternoon at 3 o'clock Jean and I went to the Senate House for the formal inaugural meeting. Promptly on the stroke of three the Chancellor of the University, Earl Balfour; and the Vice Chancellor, A. C. Seward; led by three Bedels carrying maces; marched into the room in slow time, everybody standing.

Addresses by Balfour; W.W. Campbell, President of the Union; J. H. Jeans, President of the Royal Astronomical Society; and F.W. Dyson, Astronomer Royal; were all good.

After this we walked half a mile to Downing College, where the Vice-Chancellor gave a reception. Here we met many friends, old and new. I may say that these international meetings are largely attended. Astronomers are keen to meet their fellows from other countries; and it may be remarked that the number of professional astronomers in the whole world is so small that, after attending several of these meetings, it is possible to consider them all as personal friends.

### General Assembly

On Wednesday, July 15, at 10 a.m., there was a meeting of the General Assembly of the Union, with an excellent attendance. Campbell was in the chair and read his address, in which he paid high compliment to Fowler for his work as secretary. The question of the Germans entering the Union was also referred to, and the members present were evidently quite favourable; but the International Research Council, which was responsible for the organization, had refused to change the constitution to allow it. To be a member of



the Union a country had to be a member of the League of Nations.

At this meeting I was named Chairman of the Commission on "Shooting Stars" in the absence of W.F. Denning; and at the meeting on the following morning I was appointed to the Finance Commission.

#### Receptions and Entertainments

From four to six on Wednesday there was a garden party at the University Observatory which was three-quarters of a mile west of the town. Here we examined the historic Northumberland equatorial and the instruments used by Huggins in his fundamental work in astrophysics; as well as the regular equipment.

At the reception in the evening at St. John's College I saw the original memorandum made by J.C. Adams when an undergraduate, regarding his intention to examine the irregularities in the motion of Uranus to see if a more distant planet was causing the disturbance. There were also other MSS. on exhibition.

Next evening there was a reception at Sidney Sussex College. The grounds were illuminated by candles along the paths and by Chinese lanterns and looked very pretty. In the lodge was a musical program, Piano, Violin and Vocalist, of good quality. It was intended to have refreshments outside, but threatening rain (which did not come) caused them to be held in the College dining hall. I met Prof. and Mrs. Abetti of Florence, Italy, both of whom spoke good English. I told Mrs. Abetti that while we were in Florence I walked past their observatory when I was on the way to Galileo's House. She told me that the House had been made a national monument and could not be altered externally; also, that at that time an American teacher of music was occupying the house.

On Friday, July 17, while Jean went to a lecture on Cambridge



the other three of us went to Magdalene College to see the Pepys Library which is kept in a special building and having the books on the shelves exactly as Pepys had left them (d. 1703). It was interesting to see close up an original volume of his famous diary, also the map used by Drake in his explorations, as well as the books in general of his library.

We also went to Jesus College, near which we were living, and were shown about by the Verger, an educated old man who had been there for 45 years. There were fine windows by Burne-Jones, and a ceiling by William Morris. Still to be seen were remains of the old nunnery on the site of which the college was built in 1497. Cranmer was one of the students of this college. I was surprised at the amount of playgrounds they had.

In the evening Jean and I went to Queen's College, founded in 1448 and re-founded in 1465, and the most picturesque of all the colleges. We were astonished at the wonderful furniture and the "wig-room" in the President's apartments, but we spent most of our time out of doors, the grounds being lighted by lanterns and candles. The elaborateness and beauty of the gardens exceeded anything we had at home. Professor Newall, the astrophysicist, took us up to the rooms occupied by Erasmus who taught Greek in this college 1510-13, and we looked out on the fen country as he used to do.

On Sunday morning (July 19) our travelling companions started in our car for Lincoln. They left it there and went on to Edinburgh by train. When my astronomical program was completed we all met in Lincoln and continued on our pilgrimage.

On Sunday afternoon there was another gathering at the Observatory. The well-known A.S. Eddington was Director and the



rising W.M. Smart was on his staff. A large number of well-known astronomers from a dozen countries had come together. After drinking in the house we went outside and had pleasant conversation with people of different nations. In general, those from other lands were better linguists than the English-speaking persons.

During the afternoon a manifesto was prepared urging that the International Astronomical Union should become "truly international". The signatures on the first line were of H. von Zeipel (Sweden), A.S. Eddington, E. Strömberg (Denmark). I signed on the second line. It seemed to have the approval of everyone.

In the evening we went to the "Round Church", which was near our rooms, but we did not enjoy the service, there was too much ritual. We expected the Bishop of Ely, but he was to preach the following Sunday.

#### Work of the Commissions

My Commission (or Committee), No. 22, Shooting Stars, met at 9.30 a.m., Sat., July 18. Rev. Martin Davidson was secretary. There was a good attendance of members and also some visitors were present, which led to a useful and interesting discussion. Two resolutions were passed, one referring to a new list of meteor radiants, the other regarding the next President of the Commission. A formal report of the Commission was presented at the General Assembly on July 21.

On Monday morning (July 20) I attended a Commission appointed to consider the notation of Time. The observations of the astronomer are made mostly during the night and as it is not convenient to have a change of day in the midst of one's work, it had been the custom for many years to consider the astronomer's day to run from noon to



noon. The time thus recorded was denoted Greenwich Mean Time, G.M.T. A demand had arisen for the Astronomer's Day to coincide with the Civil Day, i.e., from midnight to midnight. The Astronomer Royal stated that the Admiralty, which controls the Nautical Almanac, demanded that the day begin at midnight and that the time be called G.M.T., thus using an old term with a new meaning.

It was proposed to print "G.M.T., Universal Time" in the Nautical Almanac. The French delegates proposed "G.C.T.: Universal Time ", which I thought preferable. A resolution presented by Prof. R.A. Sampson, that we could not agree with the request, was carried, 7 to 5.

In the afternoon I attended the Solar Physics Commission, No. 27. Deslandres of Paris spoke at some length on his work and asked for £300 a year for three years from the Union. Abetti asked for £40 for three years. Resolutions favouring these requests were passed.

#### Apparatus and Big Business

Then <sup>V</sup>U. M. Slipher and I walked over to the Cambridge Instrument Co's., works. Sir Horace Darwin, the youngest son of Charles, was president, and with his daughter received us. We were shown through the works and were surprised to learn that there were 500 employees. We saw pyrometers, temperature recorders, electro-cardio-graphs, instruments for photographing the retina and other apparatus, mostly elaborate. Tea was served at 4 o'clock. I had pleasant conversation with Rev. M. Davidson (South Ormsby, Lincolnshire), R.M. Stewart (Ottawa), W.J.S. Lockyer (Devon), P.J. Melotte, C. Davidson, J. Jackson (of Greenwich), and others.

Jean visited Girton College and drank coffee with Lady



Darwin.

A.S. Eddington and J.J. Thomson

At 8.45 p.m. I listened to J.J. Thomson and Eddington at a meeting of the Cambridge Philosophical Society. There was a full house. The former spoke on the Nature of Light, the latter on the Interior of a Star. It reminded me of the historic meeting of the Royal Society on June 12, 1689, at which Newton spoke on the Wave Theory of Light and Huygens on Gravitation.

This was the end of a well-spent day!

General Assembly--Special Convocation--Banquet

On the morning of Tuesday, July 21, there was a session of the General Assembly at which formal reports of the Commissions were received. I presented that of No.22, Shooting Stars. There was not much discussion of any of the reports. There was also an expression of the opinion of the delegates from the various countries on the admission of enemy countries to the Union, and the sentiments expressed were strongly in favour of doing so.

In the afternoon, at a Special Convocation the degree of Hon. D. Sc., was conferred on W.W. Campbell, B. Bailland, W. De Sitter and H. Nagaoka. The Public Orator (T.R. Glover) presented each in a Latin speech, and in each case introduced a joke or two. It seemed to me that to recite a paragraph about the candidate in English without any facetiousness would be much more dignified--and understandable.

In the evening there was a dinner at Trinity for the men and at Newnham for the women. At the former <sup>about</sup> 190 sat down. The food was good and the drinks were plenty. Presiding at my table



was Mr. Harrison (Prof. of Classics). I was next him and then Merlin (Belgium), Mascart (France), Henroteau (Canada); opposite, Hertasprung (Holland), Steavenson (England), de Roy (Belgium), Stewart (Canada). At the close of the meal an elaborate grace was sung and a loving cup of beer was ceremoniously circulated. Then we retired to Cloisters for coffee, and afterwards to the Master's House where the ladies had gathered. Here were many pleasant talks and interviews.

My daughter Bessie had arrived in Cambridge at 11 a.m., being met at the station by her mother. She had crossed the ocean as medical officer in charge of a party of tourists. She had received her degree in medicine in 1924.

#### Final General Assembly

The final session of the General Assembly was on the following morning (Wed., July 22). The chief business before it was to pass a comprehensive vote of thanks and to elect officers of the Union. The former was a notable document as we were indebted to many persons and bodies. It was moved by Dr. Annie J. Cannon of the Harvard Observatory and was approved with great sincerity. W. De Sitter was elected the next President and F.J.A. Stratton the General Secretary. By invitation of the Netherlands Government the place of the next meeting was chosen to be Leyden.

In the afternoon Bessie and I went to Trinity Chapel where we saw the statue of Newton by Roubillac and of Tennyson by Thornycroft; and in the Library we saw autograph writings of Milton, Tennyson manuscripts, Newton's letters and telescope, and many fine busts. Then we went to Christ's Piece, near our lodgings,



where Jean awaited us.

### Royalty at the Royal Observatory

Next morning I took the train for London and arrived at Liverpool St. station at 10.30. Taking the Underground I soon reached my friend Fowler's house in the west end. After lunch we went in his car, son Norman driving, across the city to Greenwich. Actually we lost our way, but by the help of the police we regained it, and reached the R.O. at 3.20—twenty minutes late. The streets were lined with people and by pupils from the Greenwich School.

The royal party arrived in two shining 57-H.P. Daimler cars, without markers on them. About 25 men and their wives were presented to King George V and the Queen, including Mr. and Mrs. Plaskett of Victoria, B.C., and Prof. and Mrs. Fowler. The Astronomer Royal had named representative astronomers from six or seven countries to be introduced to the King and Queen, but had omitted Nagaoka or Hirayama of Japan. This was drawn to the King's attention and, Nagaoka being present, the King went over to him and conversed with him for some time. In about an hour the royal party left and we then went into the Garden and had refreshments. There was a distinguished gathering of astronomers present.

In the evening Prof. and Mrs. Fowler and I went to the Royal Society Conversazione at Burlington House. There were some 27 very interesting exhibits, with a printed statement regarding each of them. These included the original reflecting telescope made by Newton with his own hands in 1671; four long-focus lenses for telescopes by Huygens; several mirrors by W. Herschel; replica



of an early Egyptian astronomical instrument for laying out the axes of temple buildings. We got back to the Fowler's home at 11.45 p.m.

#### Government Luncheon

There was still left the Luncheon given by the British Government to celebrate the 250th Anniversary of the founding of the Royal Observatory, Greenwich. It was held at the Savoy Hotel at 1.15 p.m., Friday, 24th July, 1925.

I walked along the Embankment to see Cleopatra's Needle and then to the Savoy Hotel. At the Head Table were seats for 18 persons, and in front of it were 12 small round tables, usually with seats for 8, although that for the Press had accommodation for 12. I was at Table 6, and the other seven were: Prof. Sir Arthur Eddington; Hon. J.M. Brodie, O.B.E.; Prof. B. Masek; H.F. Hollis; F.R.A.S.; Prof. E.W. Brown; Prof. J.L.E. Dreyer; Prof. F.M. Da Costa Lobo. The Chairman was W.C. Bridgeman, First Lord of the Admiralty. W.W. Campbell sat next him on his right and F.W. Dyson on his left. Bridgeman and Dyson were fellow students at Cambridge and both took honours in 1886.

It was a grand occasion and lasted until 3.15. Then Sidney Chapman and I (and others) walked to the Royal Astronomical Society's rooms. Tea at 4 o'clock was quite elaborate—coffee, cake, sandwiches, etc. At 4.30 we went upstairs to the meeting room which was full. Jeans was in the chair, with T.E.R. Phillips and J. Jackson on either side. The program was supplied by Campbell (U.S.A.), Lundmark (Sweden), Jones (C. of Good Hope) and others speaking on their work. The meeting broke up soon after six.

I took the train for Cambridge at Liverpool St. Station,



going into the restaurant car and remaining there until Cambridge was reached. I noticed that Prof. H.F. Newall left his home station driving a carriage drawn by horses in tandem.

At home I found that daughter Bessie had left for Parkeston Quay on her way to Antwerp to rejoin her party.

#### On the Road Again

On Saturday, July 25, we left Cambridge by the 9.03 train. We changed at Ely (15 miles) but not again until Lincoln (65 miles farther on) was reached, about 11.30. We went to the Albion Hotel and secured rooms for the four of our party. Our travelling companions were to be back in Lincoln in the evening.

Then I went to inquire about the car and found that it was in good order. After lunch we went to the Cathedral. It has a grand site on a hill and it is big and magnificent. Indeed it is claimed to be the finest church in England.

I was also pleased to take a photograph of the statue of Tennyson by G.F. Watts, beside the Cathedral. He holds in his hand the "Flower in the crannied wall."

#### Into the Tennyson Country

Next morning, after a smart rain, we packed our luggage on the top of the car and started out to visit the Tennyson country. We passed through Wragby and Horncastle and came to Somerby, where Tennyson's father was rector and where the poet was born in 1809. The scenery was plain but beautiful—hedges, elm and oak trees.

We went into the church. Not large; about fifty seats. There was a new organ, presented in memory of one who gave his life when his ship was torpedoed on 4th May, 1917.... "To live in the hearts of those we love is not to die".

We had lunch at Spilsby and then went on to Mablethorpe, a



fine seaside resort. Many there and going there. We stopped half an hour and then started for <sup>Louth</sup> Louth, where Tennyson attended the Grammar School and where in 1827 "Poems of Two Brothers (Alfred and Charles Tennyson) was published by a Louth bookseller. Then on to Gainsborough (5.45) and finally to Doncaster in Yorkshire, arriving at 6.45. We had travelled 140 miles.

#### Doncaster and the St. Leger

The population of Doncaster at this time was over 54,000. It was a thriving agricultural centre, had extensive railway shops and many coal mines were in the vicinity. Its grammar school was founded in 1533, there was a large high-school for girls and some of its elementary schools were declared to be the finest in the country. But I believe the city is best known for being a racing centre which began in 1615, and especially for the St. Leger races which were established in 1776 and are run on the Town Moor in the second week in September.

In the evening Will and I went for a walk and were surprised at the number of hotels, or drinking-places,—White Bear, Black Bull, Black Boy, etc. In a quarter of a mile there were about a dozen! The whole place looked rather 'tough'—not well-kept and many people rather shabbily dressed. While in Doncaster I saw two women wheeling a cart with ladders on it for window-cleaning.

Doncaster is 156 miles from London, by rail. Six weeks after we were in Doncaster, namely on September 10, the St. Leger races were run; and, according to the newspapers, 250,000 persons were there to see them. To transport these people required 1000 charabancs and 100 special trains.

#### York and Ripon



## York and Ripon

We started out next morning at 10 o'clock. We passed through Selby (18 miles) and came to York (32 miles). Here we saw the old city wall with its fine gates and, of course, York Minister, which is the largest of Englands mediaval cathedrals. A chief glory of this building is its great and representative collection of stained glass windows, and in 1922 there was an extensive re-setting of this old glass. Now York Minister is the name given to one of the finest church properties in Toronto, and I understand that a request for some pieces of the old glass which had been left over, for the purpose of mounting them in the new church was cordially complied with.

The morning had been cloudy and clear by turns, and we started forward for Ripon, 25 miles away. In a heavy shower we stopped for a while and when it had moderated went forward again, but on coming to Ripon the rain was harder than ever. However we got safely in the Unicorn Hotel, with the car down the hill in its garage.

The window of our room looked out on the spacious Market Square. At its centre was an obelisk 90 feet high erected in 1781 by a man who was an M.P. for 60 years. Opposite from our hotel was the City Hall on which was a plate bearing the inscription:

If <sup>ye</sup> Lord Keepe not <sup>ye</sup> Cittie <sup>ye</sup>

Wakeman waketh in vain.....(Compare Pc. 127.<sup>1</sup>) *Psalms 127.*

At 9 O'clock the Wakeman, in his three cornered hat, came out and at the monument blew his horn in a long continuous blast with no music in it.

Ripon had a population of 8300 and a cathedral having portions of a Saxon crypt dating back to 634 while the main portion of the structure goes back to 1154-81.

On the following morning (July 28) we drove four miles to



Fountains Abbey, a remarkable ruin, dating from 1132. It is in a beautiful park, the property of the Marquess of Ripon. I never saw finer grounds, with well-kept lawns, great forest beeches, elms, and evergreens, and the abbey ruins in their midst. Then we drove back to Ripon and after final preparations we left at 12.15. Some two miles out, near Baldersly Gate we ran into a side-road and had lunch. About 1.50 we got under way again, for Darlington, some 25 miles north.

#### Trouble with the Car

The country here was beautiful. It was somewhat rolling and the green fields and great trees were very pleasing. We drove on through Catterick and came to where the Great North Road divides into two branches at Scotch Corners. We ran past the turn, backed up fifty feet and then went forward fifteen or twenty feet when there was a big "bang" underneath. We went on a few feet and then got out to examine. The steering-wheel would not turn a degree; something serious!

A passing car took the ladies into Darlington and a towing-truck came out and took the car to the Ford service station. There the men took out the engine. They found that the magneto was broken up and it had cracked the transmission case. It was a serious injury to the engine. We suspected the repair man at Lincoln had left some loose wire or other object in the case which led to this trouble. This was Tuesday afternoon, and the repairs were not completed until Thursday noon, working overtime.

#### The Town of Darlington

This gave us an opportunity of becoming acquainted with Darlington, and we were very favourably impressed. It was a modern



town of 66,000 people. It produced woollens and carpets and also had large iron works.

The Stockton and Darlington Railway, the first passenger line in England, was opened on Sept. 27, 1825, mainly through the enterprise of Edward Pease, though associated with him was George Stephenson. Locomotive No. 1, the first that ever ran on a public railway, is preserved at Darlington at the Bank Top station, although at the time we were there it was at Wembley Exhibition celebrating its centenary.

The streets were wide and well paved. The people were well dressed and little poverty evident. I saw only a couple of beggars and one of them was a woman grinding out of a hand-organ the familiar, "Silver threads among the gold".

I may say that the great metal dome which houses the telescope at the David Dunlop Observatory and which was erected in 1933, was constructed at Darlington.

#### To Durham, Newcastle and Jedburgh

As we moved northward we passed into the different counties. York is the largest of the counties of England and the city of York is near where its three Ridings come together. Darlington is just within Durham County.

We started forward again at one o'clock on Thursday, July 30, for the city of Durham, 25 miles away, and, as usual, we ran into some showers. In some cases we actually could recognize the boundary of the shower—here wet roadway, here dry! In one shower hail fell. It was raining when we reached Durham. We managed to pass through its crooked, hilly streets until we came to the Cathedral,



within which we spent a few minutes. It has some features not possessed by any other cathedral. It is a great dignified Norman church and was begun in 1093. What I remember best were its great round columns.

Then we drove on 15 miles to Newcastle-on-Tyne, which is in Northumberland county. There were many coal mines, with immense dumps. We realized the significance of the saying, "Carrying coals to Newcastle". The population of Newcastle was 275,000, and it was famous for its export of coal, its shipbuilding, cannon-founding, and other great industries. Its houses were well built and its gardens were notable. Methodist churches were numerous; I noticed Wesleyan, Primitive and one New Connexion.

We reached Newcastle at 3.30 and left at 4 o'clock, starting out to cross the county of Northumberland in the north-west direction. We passed through Belsay, Otterburn, and other little places. The roads generally were good. Near the reservoir which supplies water to Newcastle we paused a few minutes. The view on reaching the moors was a contrast to the fine farming country we had passed through. It was very rolling and almost bare of trees. In passing over the Cheviots there were long hills. We entered Scotland at 6.20 and the car halted while I took a picture. As we moved on towards Jedburgh the valley of the Tweed presented a pleasing panorama. About 7 p.m. we came to the sodidly built town of 2500 population and put up at the Royal Hotel.

After supper we walked about the place. There seemed to be a large number of banks. We found the house at 27 Canongate where Burns lived in 1787, and that at 5 Abbey Close where Scott visited Wordsworth and his sister Dorothy in 1805. In our room in the hotel were framed portraits of *Hugh Miller, the 8th Marquis of Lothian and of Prince* Charlie reading a dispatch from Sir John Cope.



### Abbotsford and Edinburgh

We left Jedburgh at about 11 o'clock next morning (Friday, July 31). We went through Galashiels and visited Abbotsford, the picturesque home of Sir Walter Scott (d. 1832) on the River Tweed. We were in a party of about forty which was conducted through the premises by an old Scotchman who had been there 41 years. He had many sly jokes about the furniture, swords, dress and other things.

We had lunch just outside the grounds, and then retraced our way to Galashiels and got on the road to Edinburgh. We drove up to 13 Douglas Cr. where our companions had stayed the previous week. We all obtained comfortable rooms, with a fine view to the north, and put up the car in the garage at the "foot of the brae".

Next day we drove to Glasgow (44 miles) via Bathgate and Ardrie. When about 17 miles to Glasgow we had lunch beside the Hillend Reservoir on the north side of the road. One of our ladies got hot water for tea from a nearby cottage—very agreeably given and wishing no recompense. We arrived in Glasgow at 3 o'clock and, making our way through very heavy Saturday afternoon traffic, put up at the George Hotel on Buchanan St. It was rather ancient and I could not say it was well kept; but from our room window there was the finest show of chimney pots I have ever seen!

### In Great Glasgow

Jean and I then went to the south suburb Pollokshields, where her uncle William Laidlaw lived. It was a happy visit, and after tea we went back to our friends. In the evening the four of us paraded Sauchiehall, Renfield and other streets of the big city.



Next morning Jean and I left the hotel and went to Pollokshields again. We attended church on Albert Road and after the service walked about the neighbourhood, where there were many fine houses, all on the estate of Sir John Stirling Maxwell to which "feu rent" was paid—£6 a year by my uncle in perpetuity. One thing which specially pleased me was the profuse growth of rhododendrons in the park. In the evening a cousin went with us for a tram ride to Barrhead and Paisley, to the south-west and west of the city. There were many great factories. I was interested to see the great establishments where Coats's thread was made; also the statues of Thomas and Peter Coats.

The mainspring of my watch I found was broken and next morning I took it to Anderson at 62 Buchanan St., who put in a new one for 3s. 6d. Then I visited in three excellent second-hand bookstores and found several books on Tennyson which I was looking for. I went to a fourth shop on Parliamentary Road but a notice said it was closed for two weeks as the proprietor had gone to the country for "elemental quiet".

While we were in Pollokshields our companions made an excursion to Callendar; but at 1.30 p.m., on Tuesday they picked us up at 55 Dalziel Drive, our uncle's address, and we resumed our pilgrimage at 2.15.

#### Dumfries, Lockerbie, Keswick

We found our way through the crooked streets and at last got on the Hamilton Road. Ten miles from Glasgow we came to Hamilton, the seat of the Duke of Hamilton, and after that passed through Cumnock, Sanquhar, Kirkconnell, Thornhill, all historically interesting, and reached Dumfries at 7.15. After dinner we called on a distant



relative, Mary Kerr Grieve. Her husband was absent but her son and daughter were there; also her sister Isabel and daughter. We had a pleasant visit.

I expressed surprise at the many buses running on the roads and learned that 16 different lines ran out from this town of 16,000 and that they paid expenses. In this part of Scotland there are many co-operative organizations.

In the morning we went to see the house on Bank St. in which Burns lived, the house in the lane named Burns Street in which Burns died (July 21, 1796), and his Mausoleum in the churchyard.

Among the names in the churchyard were many Thomsons—among them, "Robert Lancaster Thomson, Clogger."

Then we drove ten miles north-eastward to Lockerbie, and called on chemist Andrew Laidlaw, Jean's cousin, who was Provost (i.e., Mayor) of the town. Seven miles south-east of Lockerbie is Ecclefechan, where we saw the birthplace of Thomas Carlyle, a modest place indeed.

Here we noticed that the brakes on the car were not holding and we went carefully on 15 miles to Carlyle in Cumberland, where the brakes were repaired. It was at 5.30 p.m. that we started to go 18 miles south to Penrith and 18 miles to Keswick. There were some hills and about 6 miles from Keswick, on nearing the top of Gategill the 'gas' gave out. It was raining, too. I ran to the top of the hill and inquired for 'petrol'. A woman suggested that I go on a hundred yards and ask a young man who had a motorcycle. He had none on hand but, in the rain, he went to Threlkeld (1½ miles) to get some. I went back to report to my friends—and found the car on the top of the hill!. They had turned the car round, in which case the fuel



would feed to the engine, and then they backed up the hill.

I got in the car and we drove on, coasting most of the way to Threlkeld. Near there we met our man, who had 2 gals. of petrol for us, which we put in our tank. We soon reached Keswick, which is <sup>n</sup>ear the north end of Lake Derwentwater and is the great tourist centre of the Lake District. Derwentwater is declared to be "the most absolutely satisfying in its loveliness of all the lakes in England". After considerable trouble we secured rooms at the County Hotel.

### The Lake District

Next morning we went southward three miles to Lodore, at the other end of the lake. The Falls Of Lodore are "pretty" but not imposing. Then we visited Friar's Crag, on the side of the lake, where there was a monument to John Ruskin. After lunch we started for Buttermere, via Whinlatter Pass. This was a bad hill but we made it. Then we went to Cockermouth, ten miles northwest, to see Wordsworth's birthplace.

On Friday, Aug. 7, we started for Grasmere and Ambleside. Going up the first hill the car stalled! With the help of a grocery delivery man and a road-patrol man we got turned round and backed up. At Grasmere we visited Dove Cottage and Wordsworth's grave. Then on to Coniston where after another back-up experiment we at last arrived. Here we visited Ruskin's grave and Museum. It was near 5 o'clock when we left, and when near Ambleside we turned south for Windermere which we soon reached. Then we drove  $8\frac{1}{2}$  miles to Kendal where we put up at the King's Arms, in a shower.

### Kendal, Wigan, Lichfield

Kendal is the largest town in Westmoreland. When we were



there it had a population of about 15,000. It is picturesquely situated but it does not live on its scenery. As early as 1331 manufactures of woollens were established here and for such the place is famous. Other manufactures have been added, and there are many fine public buildings. At Kendal Catherine Parr, Henry VIII's last queen, was born.

Our hotel was a quaint old place with winding corridors and twisting stairways, as well as rather ancient furniture—but pleasing and quite satisfactory.

Next morning (Saturday) we started out about 10.30; drizzling still. We made Lancaster ( $21\frac{1}{2}$  miles), then Preston (21 miles); and half-way to Wigan we pulled into a lane and had lunch—now a fine day.

Then on to Wigan, a smoky town of 90,000 population, producing much cannel coal, and then to Warrington, Knutsford, Newcastle-under-Lyme, and finally we reached Lichfield, in the county of Staffordshire, at 6.30—total 139 miles.

The roads were good and there were many motors on them. I did not think there were so many big omnibuses in this part of the country. They were all crowded, out for a run to the west coast or on some other holiday objective. From London to Lichfield the distance is 118 miles.

After a brief rest we went out for a walk and saw Sam. Johnson's birthplace, Boswell's House, and monuments to Johnson and Boswell. After dinner we inspected the cathedral, one of the most beautiful in England, the parks and Garrick's House. In the cathedral is the "Sleeping Children", the masterpiece by Chantrey (1817).

In the morning Jean and I went to the Wesleyan Chapel and



heard a young man condemn war and blame the Church for not exerting a stronger influence against it.

We left at 2 p.m. The Lichfield hotel was the only one on our travels in which there were spring blinds like those at home. When I visited my aunt's house in Manchester in 1898, I noticed that the blinds were of linen and could be taken down and washed.

#### Kenilworth and Stratford-on-Avon

In the afternoon we passed Kenilworth and Warwick Castle but they were closed to visitors on Sunday. We noted that the former was covered with ivy and that east of the old ruined castle was a modern one which was occupied.

We arrived in Stratford-on-Avon (40 miles) about 7 o'clock. We obtained rooms at the Red Horse and after we had got settled we started for the Bancroft Pleasure Ground, by the river, where the band was playing—but the rain fell, several showers.

In the morning we visited Shakespeare's House and Harvard House. From the register of the latter I found that the secretary of the Toronto Harvard Club (Trainer) had been there three days earlier.

We were greatly interested in the Shakespeare relics—the old desk, the kitchen, the birth-room, a copy of the First Folio and other books and documents. All these things quickened our interest in our greatest poet.

In the Church we saw the Tomb, of course, the Font and the Parish Register. A beautiful avenue of lime-trees led up to the church door.

At about 2 o'clock we left Stratford. There had been showers but areas of clear sky, too, and the car sped along nicely. First we visited Shottery, a mile away, to see Ann Hathaway's cottage. Then



we climbed a long hill travelling south-west to Evesham. We passed through Chiltenham, Stroud, Nailsworth, and came to Bath in Somerset. Much of the latter half of this road was hilly and the valleys were beautiful. The last five miles were down hill into Bath, where we arrived in a heavy rain. We found the Francis Hotel on Queen Square and got good rooms. Ours was No. 23 (for good luck!) and was the best since leaving home—at least the biggest and grandest!

### Wonderful Bath

We visited the Grand Pump Room and I took a glass of the warm 'mineral' water, and I examined the Tompion clock at the end of the room, which is mentioned in Pickwick. Thomas Tompion was a famous London clockmaker (1639-1713) and this clock has a hand to indicate the equation of time.

We inspected the Circus, in which many famous men have lived; also the Octagon, formerly a private chapel at which William Herschel was organist, now a fine shop where antique furniture was sold; also 19 New King St., where Herschel lived in 1781 and where his telescope was when he discovered the planet Uranus. In the afternoon we attended a band concert in the Royal Victoria Park by the Gloucester Regimental Band and it was very good. Then we walked through the Park and the Botanic Garden. A Chinese Tree of Heaven and a Cedar of Lebanon were specially interesting. In the evening we went to see a motion picture, "The man of the Iron Mask". It was too tragic for me!

The next day it was drizzle, rain, drizzle all day. We thought it might clear up and started out about 10 o'clock for Cheddar, but the rain came down harder! We went down the Cheddar Gorge, a winding pass a mile long between perpendicular limestone cliffs, at one place, 430 ft. high, in a pouring rain. It was very impressive, but we should



have enjoyed it much more, and would have visited some of the caves in the cliffs if the weather had been fair. Then we went on eight miles to Wells. We thought the Wells Cathedral the most perfect we had seen. It was actually begun about 1186 and suffered greatly in the wars around 1685.

We had intended to visit Glastonbury, intimately related by legend with King Arthur, who indeed was said to have been buried there, but the rain continued and we returned to Bath.

#### Bristol, Clevedon, Minehead

Next day there were some clouds but these were followed by glorious weather. We started out about 10.15 and passed through Bristol (29 mi.) and went on to Clevedon (15 mi.) After a while on the shore of the Bristol Channel we went to St. Andrew's Church where the Hallams are buried, including "A.H.H.", to whom "In Memoriam" is dedicated and whose grave we wished to see. At this time a chime of seven bells was being added to the fine old church by a Mrs. Jenkins of the neighbourhood.

We ate our lunch on the cliff overlooking the estuary, there ten miles wide; very memorable!

Then we went on to Axbridge, Highbridge, Bridgewater, and finally to Minehead on the North Devon coast.

#### Minehead to Lynmouth

Next morning (Aug. 14) we left Minehead and soon had the heavy Porlock Hill to consider. There was a less steep, but still very bad, toll road which we took and made without difficulty, and got back on the main road again. A little farther on we turned left to go down to Oare Church, made famous by Blackmore's "Lorna Doone" (1869). Here it was that Lorna Doone married John Ridd and was shot



by Carver Doone.

In the church I noticed a tablet to W. Holliday Halliday, D.L., J.P., Esq., of Glenthorne ( <sup>a local</sup> allocal estate on the nearby shore), born Mar. 8, 1828; died in Toronto, May 11, 1898. We went on a short distance to Malmsmead farmhouse. The roads were very narrow but the Lord of the Manor wished to discourage the charabancs filled with sightseers and would not widen them. On this day there were parked some distance away about 50 motors of which 6 or 7 were charabancs. The people had to walk back along the valley. This surely bore witness to the power of the pen! It was due to a single story, although Blackmore wrote thirteen other novels.

Then we went on to Lynmouth, but to get there we had to slip down the Countisberry Hill which is long and has a gradient of 1 in  $4\frac{1}{2}$ . We secured rooms where our companions Will and Laura had stayed 13 years earlier!

In the afternoon we walked  $1\frac{3}{4}$  miles to Watersmeet, where the east and west branches of the Lyn come together. This was a favourite place for honeymooners to gather.

There are two villages, Lynmouth on the shore below and Lynton on the cliff 430 feet above, and reached by a steep path or by an inclined railway. In the morning (Sat.) we went up to Lynton by railway and viewed the Bristol Channel from above. In the afternoon we sat on the beach and watched the tide come in. Nothing more wonderful than the tide!

Barnstaple, Bideford, Clovelly, Camelford, Tintagel

On Sunday morning Jean and I attended the Congregational Church in Lynton and heard Mathias Lansdown preach a 75th anniversary sermon to a good audience; and in the afternoon enjoyed the sunshine



on the shore. Late in the afternoon we started out and soon encountered some bad hills. The favourite gradient was 1 in  $4\frac{1}{2}$  ; but we pulled through and got to Barnstaple, after which the road was good to Bideford.

The latter is an old seaport and owes some of its fame to Charles Kingsley's novel "Westward Ho!" (1855) Kingsley was born and brought up in North Devon. There was a pleasing statue of him on the quay. In the evening the tide was going out and there were six or eight steamers resting on the bottom.

Next morning we moved on eleven miles to Clovelly (in Cornwall) and were much interested in the place which is quaint and pleasing, but there were too many visitors and it was too commercialized. We had lunch on the cliff near where our companions had stayed in 1912. We admired the beautiful fuchsias, as tall as the eaves of the houses! The place was not as attractive as Lynmouth and neither of them as fine and odd as Adalia.

We left at 2.20, passed through Stratton and went to Camelford which had been associated with the Camelot of King Arthur. The hotel King's Arms was still marked "Post House". Leaving our luggage behind, we drove five miles to Tintagel, which is mentioned seven times in the "Idylls of the King". We got the "key to the Postern Gate" and while Jean decided not to climb, the other three of us walked up and around the old ruins. They were very fragmentary and somewhat confusing; but we felt we had made a real pilgrimage to "Tintagel castle by the Cornish Sea". (Coming of Arthur, £.187)

Wadebridge, Truro, Redruth, Penzance

Leaving Camelford at about 10 a.m. we passed through Wadebridge, Truro, Redr<sup>th</sup> and came to Penzance (45 miles).

We admired the situation of Penzance (12,000 pop.) as a



seaport; and with its mild climate it has charming surroundings. Its market gardens are productive, and in addition its fisheries and trade in ores and china-clay are important. It is also convenient for exploring the rugged and picturesque south-west portions of Cornwall.

In the morning we drove three miles east to Marazion and walked half a mile over to St. Michael's Mount, which at high tide is surrounded by water. It is a mass of granite and slate, 267 feet high, on the top of which, I should say, millions have been wasted to make it look like a castle. We ate our lunch on the sand on the mainland and watched the children heading inwards as the tide slowly rose.

Then we drove eastward to Helston and southward ten miles to Lizard Point. The country passed through was rather poor--moorland, with fields of pasture and occasionally of wheat. It gave us great pleasure to sit on the rugged shore and watch the ships go by. At one time we saw seven. In the evening we went to the station to meet our daughter Bessie, who had left Stratford-on-Avon at 11. a.m.

Next day (Thurs. Aug. 20) we five drove to Morvah, Pendeen, St. Just, Sennen, Land's End, returning via Lower Hendra and taking in Newlyn and Mousehole. The country was rather rough. There were few trees, but much bracken, rhododendrons, heather and occasional grain fields. At Land's End great ships were continually passing by.

#### To Exeter and Southampton

Our next objective was Southampton, 250 miles to the east. In that city the 1925 meeting of the British Association for the Advancement of Science was to be held from Tuesday, Aug. 25 to Tuesday, Sept. 1, and we wished to attend it.



We left Penzance on Fri. Aug. 21. Near Bodmin we saw five or six tall steel towers, probably for wireless telegraphy; and then passed through Launceston and came to Exeter (113 miles).

Next morning we inspected the Exeter Cathedral, which impressed us favourably. There were many tablets on its walls. One was to Samuel Sebastian Wesley, Mus. Doc., who was organist there for many years. Another was to R.D. Blackmore, but the larger number were to Military people. I concluded that the people of Devon were a fighting race.

There were more steel towers near Dorchester. We passed through Honiton, Axminster, Dorchester, Bere Regis, Puddletown, Tolpuddle, and Poole. On Sunday morning Jean, Bessie and I went to Parkstone Congregational Church and enjoyed a good service. There seemed to be many Congregational churches on our route. In the afternoon we motored five miles to Bournemouth, with its beautiful beach and gardens, but too populous for my taste.

Next day we drove to Wareham, Corfe Castle, Swanage, all pleasant Dorset towns. We also went to Dorchester to inspect the Maumbury amphitheatre and Maiden Castle. Much of this part of the country was made famous by Thomas Hardy. At Puddletown in the churchyard I found a tombstone to Miriam Chant, d. Apr. 8, 1840, aet. 48, and George, her husband, d. Aug. 3, 1852.

On Tuesday, Aug. 25 we moved on. We took in Bournemouth (where a regatta was being held), Christchurch, Hinton, Lyndhurst and passing through the New Forest came to Southampton.

#### British Association

We went to the B.A. reception room and registered and found that our billet was 28 West Park Road, which was only a short distance



away.

Southampton, then a city of 160,000 population, is a great sea-port and ships of the largest size were continually arriving and departing. We were able to inspect the Aquitania and the Majestic, which was originally the Bismarck.

We attended the President's Address by Horace Lanib, whose subject was the "Figure of the Earth", and the paper by W.A. Parks as president of Section C on the "The Cultural Aspects of Geology". In Section A I heard the presidential address by G.C. Simpson on "The New Ideas in Meteorology and How Applied to Forecasting"; and a paper by F.W. Dyson on "Fixing the Position of the Equator"; also a paper by W.G.L. Swann on "Cosmic Radiation to Earth", and able papers by Appleton and Smith-Rose on Wireless Telegraphy. We were also at a popular lecture on "Whaling in the South Seas" by W.J. Dakin.

On Friday afternoon we all drove up to Winchester (12 miles). I was very anxious to see King Arthur's Round Table which had been for centuries in the Great Hall of Winchester <sup>Castle</sup> ~~Table~~. It is made of oak, is 18 ft. in diameter and has ample seating space for a Sovereign and the 24 Knights whose names are around its margin. There is record of its hanging on the wall before 1378, but its construction shows that it was intended to be in a horizontal position resting on legs. In the year 1522 the Emperor Charles V visited England and King Henry VIII took him to Winchester and showed him the Round Table. Immediately before this, on the King's orders, the Table was repainted, and the pattern and the colours seemed marvellously fresh to me when I gazed upon this notable object.

I was anxious to obtain some evidence of the historic reality



of King Arthur, but the big disc on the wall did not supply it. The town of Winchester and its ancient Castle reach back to the time of William the Conqueror—but they do not remove the traditional nature of King Arthur.

Excursion to the Isle of Wight

The Local Committee at Southampton had arranged an all-day excursion on Saturday to the attractive Isle of Wight. So at 8.20 a.m., some 200 members of the B.A. took ship for Cowes, ten miles southward, on the north coast of the Isle. There we took charabancs, or buses, and went southward through Newport, the capital, and on to Shanklin on the south coast with its beautiful beach and chine, where we stopped half an hour. Then we went along the shore to Ventnor, with its beach and many visitors; then on to Blackgang chine and a fine view from the cliff; then to Carisbrooke Castle, not far from Newport. We walked along the walls of the old castle and inspected the famous old well which dates from 1150 A.D. After this we went to Brightstone, on the west coast and had an outdoor meal. Then we went to Freshwater Bay, towards the west end of the island, near which was Tennyson's country home, Farringford. Finally we were driven on <sup>to</sup> the Alum Bay, at the extreme west end, from which the Needles were seen almost end-on, and then back 15 miles to Cowes from which we returned to Southampton, arriving at 10, o'clock—after a fine day.

On Sunday morning we went to Above Bar Congregational Church, near which we noticed a statue of Isaac Watts (1674-1714), who was born in Southampton and whose hymns are said to have been first tried out in that church.



On Monday morning Bessie left for Exeter where she met a friend, Miss Williams, and they went for a week's walk in Devon.

### Salisbury and Stonehenge

Our stay at Southampton was very pleasant. We left on the morning of Wed. Sept. 2, and our first stop was at Salisbury, 25 miles to the north-west. We drew into the cathedral grounds. This cathedral is very fine, perfect outside and inside. I admired the clear view from end to end and the flood of light coming through the windows and brightening up the whole body of the church. The grounds about, covered with lovely green grass and trees set off the great building.

Then we went ten miles north to Stonehenge, which I inspected with great interest. The appearance of this monument is quite familiar, and the most important information we want about it is, when was it erected? Now the astronomer Lockyer noted that if one stood on a large flat, central stone (the Altar Stone) and looked through the opening between two great upright stones and over another stone (the Friar's Hele) some distance away, one faces that point on the horizon where the sun rises on June 21, the summer solstice; and he concluded that these stones were so placed to observe accurately the position of sunrise on the longest day in the year.

Now the sun does not rise exactly over the Friar's Hele at the solstice at the present time; and it is changing with the centuries, due to the phenomenon known as the precession of the equinoxes. If one can determine the angle between the line joining the centre of the Altar stone and the Friar's Hele and that drawn from the Altar stone and the precise spot on the horizon where the



sun now rises at the solstice, one can calculate the date the monument was erected. Estimates of that date placed it between 1900 and 1500 B.C., say 1700 B.C. or 3600 years ago.

Fresh interest has been aroused in this question (in 1952). By measuring the intensity of radiation from samples of radioactive carbon of atomic weight 14, believed to be contemporary with the monument, its age has been estimated at about 3800 years, in striking agreement with Lockyer's date.

We now continued in the north-east direction about 60 miles to Oxford which we reached at 6 o'clock. We obtained rooms at the Eastgate Hotel. While sitting at dinner that evening President Falconer came in the room. He had been in England some weeks giving a series of lectures and making public addresses. His lectures had been set in type, and for some time he had been reading "proof" of them before he should leave for home on Sept. 4. We had a long talk, exchanging experiences. My companion and I were very sure his visit to England brought great credit to Canada.

#### Oxford University

As to which is the greater, Oxford or Cambridge, you will have to make your own choice. Through the centuries they have developed along similar paths.

Oxford has 21 colleges and many other educational institutions which are connected with it but not incorporated into it. We first visited Magdalen, which was almost across the street from our hotel. The grounds are large and fine. New buildings were going up and old ones being repaired. I saw two men sawing a block of stone, using a crosscut saw—a week's work. Then we went to Merton, with its



fine old library. We also peeked into Corpus Christi; I wished to see its remarkable sun-dial with its perpetual calendar which was erected in 1581.

In the afternoon we went via Abingdon and Steventon to Wantage, and then over poor road to White Horse Hill. We had difficulty in finding the "Horse". We had actually walked along its back and had not recognized it; but a woman showed it to us. The fine view from the top well repaid us for the labour of climbing the hill. King Alfred the Great was born here in 849 A.D.

Next morning we visited ~~the~~ St. John's College. The Gardens Of St. John's were said to be the most beautiful in the University. On the gate we read, "No Smoking Allowed in the Garden". Then we looked into Oriel College, with its picturesque front quadrangle; and after this spent the rest of the morning in the Ashmolean Museum, which pleased us very much. The archaeological parts were very well arranged and most interesting. The pictures also were good, among them being an excellent selection of Pre-Raphaelite paintings.

After lunch Jean and I walked up to Keble College, to see the college and especially Hunt's "Light of the World".

Then we went to Pembroke College, where we saw the beautiful Chapel, the fine Hall with Johnson's portrait, the Library with his chair, the Desk at which he worked on his Dictionary and the Desk he used as a teacher. In the Common Room were his Tea-pot and Mug.

#### Farewell to Oxford: Our last Picnic

On Saturday, Sept. 5, at 10 o'clock we left Oxford. The car tripped along nicely to Henley-on-Thames (20 miles) and then to Maidenhead (10 miles), and a little farther on, in sight of Windsor Castle, we had our last picnic. A tramp moved past in the lane in



which we had parked, and built a fire to make tea. We gave him what remained after our meal.

The rain fell slightly and we started on. We passed through Windsor and Eton and Slough and the rain became heavier. Then we followed the tram lines to Ealing and Acton and came into London along Uxbridge Road, Bayswater Road and Oxford Street. We turned up Southampton Row and near the top drew up at the Cora Hotel, where we had engaged rooms. We took off our luggage and put it in our rooms; and then Will and I drove to Hayes's on Euston Rd., but the place was closed. We found a place for the car in a garage off Gt. Portland St. The rain continued all the time.

Spurgeon's Tabernacle; Royal Observatory

Next day (Sunday) Jean and I had been invited to dinner with the Astronomer Royal.

About 10.30 we took the car to Elephant and Castle, and inquired for Spurgeon's Tabernacle. There were about 1000 persons present. The boys and girls from his orphanage sat on the platform and acted as the choir. There was only a piano to lead and the singing was good. The preacher was H. Tydeman Chivrell. He spoke first to the boys and girls and then gave a very simple evangelic sermon. The announcements showed that many services were held during the week.

Then we took Bus 48 to Greenwich and got to the Royal Observatory about 1 o'clock. The Dysons were very friendly and kind. Miss Dyson (F.W.D.'s sister) and two daughters (Elsie and Ruth) were there. We had pleasant talk before the grate fire, and at about 3.40 we left. F.W.D., escorted us to Bus 53 which took us to Trafalgar Square, and we spent until 6 o'clock in the National Museum, where we found a wonderful collection of pictures, all schools being



well represented.

A good day!

Good Bye to the Car

On Monday Morning Will and I went to Hayes's and told the partner that we had got back with the car, and then we went to the garage and brought it. He examined it and said it was in good order. He gave us £25 in cash and cheque for £10. We expressed appreciation of his treatment of us.

As to the car, it had failed us many times and some of its failures had been expensive, but it gave us great pleasure and satisfaction. On the whole it was a great success.

About 2 p.m., Bessie rejoined us, having returned from Bude in Cornwall by the Southern Railway. She was enthusiastic about her walking expedition. Then while she and her mother visited some shops on Regent St. I looked into some book-shops on Charing Cross Road where I picked up three books on the Holy land and one on Tennyson.

After supper we three went by Underground to say good-bye to our friends the Fowlers in the west end and to bring home a parcel we had left there.

Next day we attended to some business, and I reserved seats on the train to Macclesfield to say good-bye to relatives.

After tea I walked with Jean and Bessie through Lincoln's Inn Fields and on to the Strand Theatre. There Bud Williams met Bessie and the three women went to the 300 th night of "Just Married", while I walked home.

There Laura had brought a little present for Jean's birthday (her 56th), and Will and I finally settled up our joint account. He



paid me £1. 6s. 5d. It was a very pleasant adventure in seeing England. We were to separate on the morrow. My family would go to Macclesfield to bid good-bye to relatives and our companions would meet us on the ship at Liverpool.

#### Macclesfield and Liverpool

Wednesday, Sept. 9 was cold with rain. We spent some time in packing up, and to get a change I walked down to the British Museum. I had a last look into the Elgin Marbles Room, the Ephesus, the Mummies and some other rooms. Always something new—and much of it!

By taxi we went to Euston station and took our seats on the train. It stopped at Rugby and Stoke-on-Trent. Our cousin was at the station to meet us at Macclesfield (170 mi.), in Cheshire, which was the chief seat of the silk industry in England.

We had a pleasant visit for a day and then on Friday, Sept. 11 we moved over to Liverpool. Our ship, Regina, 16,500 tons, was pulled over to the wharf at 3 p.m. Our companions arrived at 4 o'clock and we finally got aboard. At 5 o'clock we were pulled out into the stream and started away.

Next morning at about 6 o'clock we anchored off Greenock, and soon after the tender from Glasgow arrived with additional passengers—and also, to our surprise, our dear Cousin Madge from Glasgow. She had obtained a permit to come aboard, and she brought a beautiful basket of fruit, a box of heather and two packs of cards. We had played cards during our visit to her father's house in Pollockshields.

At last the tender put off and at 12 o'clock noon we started on our westward journey.



### Atlantic Crossing

The ocean passage was uneventful, although for five days we had strong winds and high seas. On Monday evening the 14th and again on Wednesday evening there was a fine auroral display showing curtains tinged with red, and many streamers extending both north and south of the zenith. On Thursday the 17th I watched the sun set, and just as it disappeared I saw the "green flash".

We saw Belle Isle <sup>on</sup> Thursday <sup>September</sup> 17th at 9 a.m., and at 9 am., on Saturday <sup>the</sup> 19th, we pulled into the dock at Quebec.

We reached Montreal at 7 a.m., Sunday, September 20th. Bessie went directly to Toronto, leaving at 10 a. m., and arriving at Toronto at 5.40 p.m. Jean and I went by way of Ottawa, where Etta, <sup>our</sup> eldest daughter, was then living. We left Montreal at 8.15 a.m., and reached Ottawa at 10.45. Leaving next day at 1.15 p.m., we arrived in Toronto at 8.45 p. m. Home again!

Finished Oct. 1, 1952.







Chap. XXII

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Ch. XXII. Astronomy in the University - The  
David Dunlap Observatory

1. New Courses at the University of Toronto

The Astronomical Society

When I returned to the University in the autumn of 1891 it was to be Fellow in Physics. This was a sessional appointment; a year later I was made Lecturer in Physics, a permanent position on the staff.

In 1890 there had been incorporated the Astronomical and Physical Society of Toronto. This replaced a small body of scientifically-disposed persons who met at intervals at their houses. The new society was becoming well known, because the well-prepared proceedings of its meetings were readily printed in the newspapers. I attended some of its fortnightly gatherings and found them very interesting, and it was quite evident that the chief emphasis of the Society was on Astronomy.

Active Amateurs in Astronomy

The first real "touch" of Astronomy which I experienced occurred when I was teaching in a public school in the country. On leaving home at the end of 1883 to take charge of this school I put in my new trunk Sullivan's "Geography Generalized", which my eldest brother had used as a text-book in 1870 in Markham Township S.S. No. 8. In it was a chapter entitled "Introduction to Astronomy." This was largely a description of the Solar System, written in simple terms and with series of numbers arranged so that one could easily understand and memorize the leading facts. What I heard here, in the Society's meetings, was of a different nature. To me the outstanding feature was the reports, by various



members of the Society, of actual observations made on objects in the sky. Also, there was a freshness and newness in the discussions which appealed to me.

At first the Society continued to meet in the homes of the members, which gave a feeling of friendliness to the gatherings. However this peripatetic movement of the meeting-place could not continue, and the first fixed place of meeting was at the Y.W.C.A., 19 McGill St., and the first gathering there was on August 22, 1893. I was elected a member of the Society at the meeting held at the home of John A. Paterson, 23 Walmer Road, on December 13, 1892.

The first published list of members was in the Report of the Society for 1892; and the number of Active Members was 88, eight of whom had addresses outside Toronto.

#### Change of Name of the Society

The Society continued to grow and to spread beyond the city. Its name had been found to be inconveniently long and cumbersome, and in May 1900 it was altered to the Toronto Astronomical Society. The change, it was explained, was made "for reasons of expediency, but chiefly in order that it may possess the shortest corporate name capable of indicating its objects".

However this brief designation was used for only two years. Someone with a broader outlook and perhaps having more ambitious plans for the future, suggested the name, The Astronomical Society of Canada, which was found acceptable to the members. But before proceeding further a request was made to the Governor General for permission to prefix the word "Royal" to this name. This request was forwarded to England, and the King expressed his approval.



I may remark that G.E. Lumsden, the capable Corresponding Secretary of the Society, was Assistant Provincial Secretary of Ontario; also, that Joseph Pope, the Under Secretary of State at Ottawa was an enthusiastic amateur astronomer.

On March 3, 1903, by order of the High Court of Justice of Ontario, the Society's name became "The Royal Astronomical Society of Canada."

### Improvement in the University

My continued interest in the Astronomical Society impressed upon me the fact that the University was not giving to the subject of Astronomy the attention it deserved. Two lecture courses in it were offered. One was a course in Elementary Astronomy which was taken by some of the students at the School of Practical Science and could be taken by students in the Pass Course in the Faculty of Arts. The other was an advanced mathematical course which could be taken as an option by Honour Students in Mathematics in their fourth year. Neither course included the application of Physics to Astronomy, i.e., astrophysics, although in the previous thirty years it had given new life to astronomical questions and had increased popular interest in the subject.

I consulted my colleagues in the departments of Mathematics and Physics, and asked if they would support me in an endeavour to improve the position of Astronomy in the University. They all cordially agreed to do so.

### A New Graduating Course

For about twenty years in the well-established Course in Mathematics and Physics, candidates had an option in the final year - they could graduate in Pure Mathematics or in Physics. It was now proposed to add a third option, namely, Astronomy and



Physics. Near the end of 1904 the University Senate passed a statute establishing the new graduating course.

In order to bring it to the notice of the students I prepared a statement outlining what had been done, hoping to have it published in The Varsity, the students' newspaper. I signed the article, but the Editor inserted it promptly on the editorial page of the issue for February 16, 1905, signature and all.

The subjects to be taken in the final year were: - Elementary Astronomy, Advanced Theoretical Astronomy, Practical Astronomy, Celestial Mechanics, Differential Equations, Theory of Least Squares, Physical Optics (including Spectrum Analysis).

This addition to the curriculum made desirable a change in the organization of the department. Hitherto I had been a member of the Department of Physics. Now the sub-department of Astrophysics was created, with an appropriation of its own, and I was in charge of it.

#### Need of Equipment

To teach effectively some of the just-mentioned subjects demands the use of telescopes and other instruments and these I set out to obtain.

The Meteorological Office, which was located on the University grounds for over 65 years, possessed a 6-inch equatorially-mounted telescope, the tower for which was erected to observe the Transit of Venus in 1882; and a transit-instrument through which accurate time had been supplied to the city and the country for many years. The Director of the Office was willing to allow the students to use these instruments. On my recommendation the two men in the Office who had charge of these instruments were appointed Assistants



in Astronomy in the University, and they gave instruction in practical astronomy to the students who went up to them. This was a considerable service to the University, but I looked forward to the time when we should have our own instruments and be able to use them when we pleased.

#### The University and the Astronomical Society

I was president of the Royal Astronomical Society of Canada during the years 1904 - 07, although the usual tenure of that office was two years. I was anxious to secure co-operation between the University and the Society. I proposed that the University should supply a room for the meetings of the Society and a smaller one for the Society's Library and Office; and receive, in return, the use of the Library and of certain instruments which the Society possessed. But with the best of good will on both sides no satisfactory arrangement could be reached.

Soon after the graduating course in Astronomy and Physics was established I suggested to the Council of the Royal Astronomical Society that the Society might perhaps provide a Gold Medal to be awarded to the candidate who stands first in first-class honours on graduation in the new course. This was approved. The first award was made at Commencement in June 1906, on which occasion I had the pleasure of presenting the medal to William Edmund Harper and at the same time of informing him that a telegram just received from the Chief Astronomer at Ottawa stated that he had been appointed to the staff of the Dominion Observatory there, which had just been established in the preceding year. Mr. Harper later became director of the Dominion Astrophysical Observatory at Victoria, B.C., where he died June 4, 1940. His ability and unremitting industry contributed largely to the high



standing of Canada in the astronomical world.

For many years after the honour course in Astronomy and Physics was instituted there was a steady stream of capable young astronomers going forth, and for perhaps 25 years it gave me great pleasure to note that practically all the astronomers in Canada, who were found chiefly in observatories, in the Government services and in the teaching profession, had been my personal students.

#### Visit to Observatories in Eastern States

I was anxious to emphasize the practical side of astronomy and thought I might obtain useful information by visiting some of the observatories in the United States. Further, there was a total eclipse of the sun visible in eastern Canada in August 1905, which I hoped to observe, and I was desirous of getting some suggestions regarding it.

On May 3, 1905, I left Toronto at 9.45 a.m. by C.P.R.; and at Buffalo at 1.00 p.m. boarded the Empire State Express. I reached Syracuse at 3.45 and was met there by Fred A. Saunders of the Class of '95 U. of T. He was professor of Physics at Syracuse University, a reputable institution under the control of the Methodist Church. Saunders was the youngest of the five sons of William Saunders, of Ottawa, Director of the Experimental Farms of Canada. Fred and the two brothers next to him, --Percy, professor of Chemistry in Hamilton College, Clinton, N.Y., and Charles, the discoverer of Marquis Wheat, -- were B.A.s of U. of T. and Ph.D.s of Johns Hopkins. The entire five were profound scientists and also accomplished musicians.

We went through the Physics Building, which was erected in 1898 when Eugene Haanel was professor of Physics there. For a number of years Haanel was on the staff of Victoria University when it was located at Cobourg, Ont. He was a notable member of



the faculty, and when I was a lad I used to hear stories of his classes in physics and mineralogy. He was a thorough German, a Ph.D. of Breslau University. Arthur P. Coleman, who achieved distinction as professor of Geology at the U. of T., and who discovered the great nickel deposits near Sudbury, was one of Haanel's students at Cobourg and went to Breslau to take a graduate course. When University Federation was consummated and Victoria moved to Toronto, Haanel secured a position at Syracuse. Another of Haanel's students at Cobourg was Clifford Sifton; and when he became Minister of the Interior at Ottawa he appointed Haanel Superintendent of Mines and brought him back to Canada.

We also inspected a small observatory, built of stone, in which was a high-quality 10-inch telescope, furnished with a spectroscope. I admired the outfit and was sorry to learn that it was not in regular, constant use at this time. It was large enough for important researches to be made with it. Also, it was suitable to show celestial objects to the public.

I found that a 9- or 10-inch telescope, in a pleasing building, was a favourite gift to a college in the U.S. It was much superior to anything we had in Toronto.

I was informed that the attendance at Syracuse University then was 1000 and that its income was \$125,000; an institution comparable with our own.

#### The Dudley Observatory at Albany

I said good-bye to Dr. and Mrs. Saunders and at 7.45 boarded the train for Schenectady where my brother-in-law, George Laidlaw, met me at 11.30 p.m. George was a skilled employee of the G.E. works and with him in the morning I visited once more the "House of Magic".



In the afternoon I went to Albany to call upon Lewis Boss at the Dudley Observatory. This institution was established in 1851 through gifts by citizens of Albany and was given its name from the largest donor, Mrs. Blandina Dudley. In its early history there were some interesting episodes. Boss was appointed in 1876 and a new building on a new site was completed in 1893. Its chief instruments were a 12-inch equatorial, the lens by Brashear and the mounting by Warner and Swasey; and a meridian circle by Pistor and Martins, having an aperture of 8 inches and graduated circles a metre in diameter. The latter instrument was treated with <sup>the</sup> utmost respect. It was being used by Boss to determine with <sup>the</sup> greatest precision the position of the stars in the sky. He was then engaged on the preparation of a Fundamental Catalogue of Bright Stars (I and II mag.) for the Carnegie Institution of Washington, which had taken over the Observatory as its Department of Astronomy.

Boss was almost 60 years old and had had experience with politicians and newspapers, and I enjoyed a long talk with him on observatories and equipment. He insisted that an observatory should have a convenient location. A students' observatory should be near the other university buildings, and a research observatory should be easy of access. He told me that George Ellery Hale who, as every one knows, was the one who obtained for the University of Chicago the great Yerkes Observatory with its unequalled 40-inch refracting telescope, remarked to him that he would be pleased if he could wake up some morning and find the mighty telescope on the lake shore near Chicago and not on Lake Geneva 75 miles away. Later it was the same Hale who secured the construction of the 200-inch Mt. Palomar telescope. In all my efforts in later



years to secure an observatory and astronomical equipment for the University of Toronto, I kept firmly in mind Boss's advice on convenience of location.

Boss was born at Providence, R.I., October 26, 1846; graduated at Dartmouth in 1870 (on the classical side); and died October 5, 1912.

#### Todd at Amherst

Next day I went to Amherst to consult David P. Todd. He was well known as a man of originality and ingenuity. He had published "A New Astronomy" and "Stars and Telescopes", both of which I had found very useful.

Professor Todd was just completing the equipment of a new observatory. His chief instrument was an 18-inch Clark refractor. The objectives of the great Lick (36-in.) and Yerkes (40-in.) were both made by the Clark firm. The details of Todds' 18-inch were interesting, often novel. The pier, as I remember it, was a massive cast-iron water-pipe. The shutters of the dome were wider than usual and were opened and closed by right - and - left-hand screws and they came snugly together, angle-iron fitting against felt. His observing chair was to be hung on the revolving dome. He had a 3-in. and a 6-in. transit, and a 12-in. photographic equatorial. He had a well 33 feet deep at the bottom of which was to be a pool of mercury to act as a flat horizontal mirror. Also, to be mounted in this well, he had a Foucault pendulum and other apparatus. Afternoon tea with Professor Todd and his accomplished wife, Mabel Loomis Todd, completed a very pleasant visit.

For our equipment at Toronto Professor Todd suggested: 3-in. equatorial, 4-in. equatorial with clockwork;  $2\frac{1}{2}$ -in. and 3-in. transit instruments, portable zenith telescope, level trier, barograph and thermograph, 3-in. aperture meridian circle,



spectrograph for the 6-in. telescope in Toronto, camera with colour screens, 2 sextants, 2 chronometers and clocks. A good list!

#### At Harvard

At Cambridge, Mass., I discussed the coming eclipse with E. C. Pickering. He was professor of Physics in the M.I.T. when he was chosen (1876) director of the Harvard College Observatory, and naturally much of the research carried on here was of the physical type. I told him that I was interested in polarized light and had in mind to investigate further if the light from the chromosphere and the corona of the sun showed evidence of being polarized. He suggested that I use a polariscope having a tin-foil grating at its focal plane, the open and the opaque spaces in the grating being of equal width; after this, a double-image prism placed before the field lens of the eyepiece; and, next to the eye, a nicol prism mounted on a graduated circle which could be rotated. If the light from the eclipsed sun was polarized there would be colour; otherwise, not.

I had a long interview with Dr. R.W. Willson, of the University staff (quite separate from the Harvard College Observatory) who worked hard to give to the ordinary students in Arts a real understanding of practical astronomy. He used several transit instruments with micrometer eyepieces, for determining time and latitude, and two of them were far enough apart to determine difference in longitude; also, he had small equatorial telescopes for observing planets, comets and other objects in the sky; and he had also arranged exercises in the use of star catalogues, almanacs and other books of reference. His work was quite similar to my own, and I admired the organization of his department.



### At Columbia and Princeton

At Columbia University Dr. S.A. Mitchell had much to tell me. He was born in Kingston, Ont., and was a graduate of Queen's University. Like myself, he had entered the domain of Astronomy through the adjoining field of Physics. He gave me useful information on transits, sextants and other instruments used in their field work in their summer school.

My visit to Charles Augustus Young at Princeton on May 10 was especially pleasing. Young was born in 1834, and from 1866 to 1877 he was professor of Natural Philosophy and Astronomy at Dartmouth College. He was the author of a series of books on Astronomy and of a book on the Sun, with all of which I was well acquainted. It was only 20 years before Young's birth that Fraunhofer published his famous paper on the spectrum of the sun, in which he described the dark lines, ever since known as Fraunhofer lines; and it was during his active manhood that the significance of these lines was demonstrated by the investigations of Kirchhoff and Bunsen (1859 - 62). Huggins, recognized as the founder of Astrophysics, published his first paper on the chemical constitution of the stars in 1863. Of course Young followed these investigations with great interest, and at the Spanish eclipse of December 22, 1870, he was the first person to see the bright-line spectrum of the sun's chromosphere, and it was he that named it the "flash spectrum". He was honoured and respected by all who knew him. He died in 1908.

As to equipment for Toronto, Professor Young's suggestions were similar to Professor Todd's. As to a building he would have it big enough, of corrugated iron inside and clap-boarding outside, with flat roofs on which one might walk without injuring m; and so on.



I had a simple lunch with Professor Young. He showed me Joseph Henry's old electrical apparatus with which he made discoveries in electric induction, similar to those made by Faraday and at the same time (about 1830); also a glass rod with sealing-wax on it which had been used by Franklin in his experiments.

#### Philadelphia and the Flower Observatory

I left Princeton at 6.18 p.m. for Philadelphia, where I was met by my friend William Ezra Lingelbach, B.A. '94 (Tor.), who was professor of German in the University of Pennsylvania, and he took me to the Hotel Normandie. At the hotel that evening, at the end of dinner, there was placed before each guest half-a-grapefruit covered with sugar and embedded in broken ice. That was the first time I saw grapefruit served. I believe the cultivation of this fruit was introduced in Florida and California in 1900. How enormously it has expanded since then!

Next morning I went out to the Flower Observatory at Upper Darby, just west of the city, and visited Charles L. Doolittle and his son Eric. Here was another of those admirable 18-inch refractors - this one by Brashear - and I admired its efficient use in the measurement of double stars by these two astronomers, although the former was interested chiefly in the variation of latitude. I learned that the elder Doolittle and also Lewis Boss were employed on the survey, during the years 1872-3-4, of the boundary between the United States and Canada running west from Lake of the Woods, along the 49th parallel of latitude.

#### Pittsburgh, Columbus, Delaware

Next I went to Pittsburgh and arranged with Brashear to construct the proposed polariscope for the coming eclipse. Of course I admired his large photographic doublets and other marvellous



optical apparatus - it all seemed like precious jewellery - and we talked over solar eyepieces, and prism and grating spectroscopes, which I hoped to order for the U. of T.

Then I went to Columbus, Ohio, where I called on H.C. Lord, who was in charge of Astronomy in the Ohio State University. He had the usual equipment of transits, sextants, zenith telescopes and chronometers for instruction in the practical side of the "old" astronomy; but also there was the McMillin Observatory, built in 1895, with its 12-inch equatorial which was furnished with a 3-prism spectrograph which had been successfully used for measuring the radial velocities of the stars. I thought it might be a suitable telescope for the U. of T. Professor Lord had been able to make valuable astrophysical investigations with it.

Finally I went twenty miles north to Delaware, Ohio, the location of the Ohio Wesleyan University, at which the professor of Physics was W.G. Hormell, who was my companion at Harvard in 1900-01. At that time there was on the university grounds one of those excellent 9½-inch refractors, the optical parts being by Brashear, the mounting by Warner and Swasey. It had been presented to the University in 1897 by Hiram Mills Perkins (1833-1924), professor of Mathematics there. It had various accessories of high quality, but, as in other places, continuous use was not being made of the fine instrument. A programme of work with it could not be fitted into the curriculum of the University, largely because to use the telescope the weather must be suitable.

However in 1922 Mr. & Mrs. Perkins donated over \$200,000 to provide a large telescope for astronomical research, and in the following year enlarged the previous observatory and its equipment. At first it was proposed to have a 60-inch reflecting telescope for the research observatory but years passed in futile



attempts to produce the disc of glass for the great mirror.

Finally the Bureau of Standards at Washington undertook the task. After much experimenting a disc was produced which made a mirror 68 inches in diameter and the telescope was completed in 1931.

(See p. 785)

#### Equipment at Toronto

As the years passed I had little difficulty in obtaining reasonable appropriations for various pieces of equipment. These included a 4 $\frac{1}{4}$ -in. equatorially mounted Cooke telescope from England and an 80-mm. Zeiss instrument, with alt-azimuth mounting, from Germany. These were portable but rather heavy to carry, and I had two light carriages built specially to trundle them out on the lawn. If I could have found a suitable site on the University grounds for a small observatory I think I could have secured a 9 or 10-inch instrument for it. The price of such an instrument was about \$5000.

However, when the Physics Building was erected in 1907 the situation was eased. I was allotted one 'unit' on the ground floor for an office and two 'units' on the third floor for an astronomical laboratory. I think I can say that I made good use of this space as well as of the roof of the building and of the University lawn.

#### In the Main Building

Before the erection of the Physics Building the Department of Physics was housed in the west end of the Main Building (otherwise, University College). For the last half-dozen of the fifteen years I was located in the Main Building, my private room was on the second floor in the fourth house in the Old Residence and was reached by a door under the brick archway; and my laboratory rooms were on the third floor above. With the accommodation I



now had in the new Physics Building I was able to make fair progress in the instruction of students in Astronomy.



## 2. A Plea for Co-operation

### The Need of an Observatory for the University

But I could not feel satisfied until I should secure for the University a large telescope in an appropriate building for carrying on astronomical research, and I was continually on the lookout for a suitable site for such an institution.

In the year 1911 the city of Toronto purchased a site for a new isolation hospital. It consisted of some 14 acres and was located on the east side of Bathurst St., half a mile north of St. Clair Ave. The property comprised the north bank of the ravine at this place, and Burton Road ran along the north edge of it, but this road had not been paved to Bathurst St. There was a big old house near the top of the ravine bank. North of the property were several imposing dwellings with exclusive stone walls about them. The price paid for the land was \$30,000; and I understood the city expected to build a driveway along the bed of the ravine.

When it was announced that the city had bought this land as a site for an isolation hospital there was a great storm of protests from the citizens of Forest Hill Village adjoining it and of Wychwood on the west side of Bathurst St., and the city had to abandon its project. What should be done with this land?

Early in 1912 on one of my walks northward I took note of this property which was only a mile and a half from my house. At once it appeared to be an excellent site for a high-class observatory and I thought that here was an opportunity for co-operation in utilizing it. Briefly, my proposal was that the land should be made a part of the city's park system - "Observatory Park" - that a small area on the highest portion should be



allot<sup>t</sup><sub>x</sub>ed as a site for the observatory, which should be managed by the University and in which should be accommodation for the Astronomical Society to hold its meetings, have its office and its Library, all to be at the service of the people.

I consulted my friends in the Society and they strongly favoured my project. A committee was appointed to carry forward my proposals. I may say that Dr. A.D. Watson was my most active supporter on this committee.

I knew that Prof. R.B. Thomson was seeking for a site for a Botanic Garden, and wrote him to examine this plot of land. He replied on June 29, 1912. The site was too small for his purpose; but just then he had been with Commissioner of Parks Chambers looking over the trees in Queen's Park in connection with the proposal to name them. He spoke to Chambers about my project of an observatory on the Bathurst St. site and found him heartily in favour of it.

Under date July 5, 1912, I wrote from Go Home Bay to Mr. Chambers explaining in considerable detail my plans, and he replied on July 10 that he would bring to the attention of his Committee the matter of transferring the land on Bathurst St. to the Department of Parks and also the question of establishing an astronomical observatory there. On my return to Toronto in the autumn I called on Mr. Chambers, who said that the land was still in the hands of the Department of Health which did not just like to give it up. I understood, also, that the price to be asked in transferring the land had not been settled.

The committee also visited Dr. C.J.O. Hastings, the Medical Officer of Health, and found him a hearty supporter of our proposal.



Memorandum for the City Council

A memorandum was carefully prepared by a committee of the Astronomical Society and addressed to the Commissioner of Parks, as follows:

Toronto, May 7, 1914.

Charles E. Chambers, Esq.,  
Commissioner of Parks.

Dear Sir,

For a long time it has been felt that Toronto should have an effective modern astronomical observatory, and over a year ago the Council of the Royal Astronomical Society appointed a committee to consider the best means to secure one. The report of the committee was adopted by the Council on March 20, 1913. It outlines a scheme in which the City of Toronto, the Royal Astronomical Society and the University of Toronto each has an important part, and, in brief, is as follows:-

1. A site admirably adapted for the purpose is situated on Bathurst St., north of St. Clair Ave., on the land originally purchased by the City for an isolation hospital. It is proposed that this land be added to the City's park system and that a sufficient portion (perhaps an acre) on the brow of the hill be permanently secured to the University and the Society for observatory buildings.

2. The general management of the institution to be committed to the University, for purposes of instruction and research, the University to be responsible for its maintenance.

3. Included in the proposed equipment would be a large telescope about twenty inches in diameter, and a smaller, though still powerful one, about nine inches in diameter. It is proposed to allow citizens to use the chief instrument on one night of each week, and the smaller one on any day, subject to necessary pre-arrangement. Should the weather prove unfavourable on the evening set apart for the chief instrument, a brief illustrated lecture on some popular theme to be given by the astronomer in charge, in a room to be provided in the building.

4. The Royal Astronomical Society during the last twenty-five years has collected an extensive and valuable library on astronomy. It is proposed that this be placed in the observatory and be at the disposal of citizens and students, the Society to employ and pay the salary of one who shall have charge of it.

5. The Society also proposes to place at the service of the public the various telescopes and other astronomical instruments in its possession, such instruments to be accommodated in the observatory building.

6. A board composed of representatives of the City, the Society and the University to be constituted for business and advisory purposes, as the interested corporations may agree.

The Report embodying the above proposals was submitted to the Board of Governors of the University on March 27, 1913. The following reply was received from President Falconer:



March 29, 1913

Dr. C. A. Chant  
University of Toronto

Dear Dr. Chant,

In reply to the proposal presented by you from the Royal Astronomical Society with regard to the securing of a site from the City for the establishment of an observatory in Toronto, I am instructed to say that the Governors approve the proposal and will co-operate with the City and the Society as far as their means will allow.

Yours sincerely,

Robt. A. Falconer, President

The committee in charge of this matter has received much encouragement in various quarters, and has reason to believe that the means will be forth coming to establish the observatory.

The committee therefore respectfully requests that you take up with the Parks Committee and the Board of Control the matter of obtaining the site as described in this memorandum.

John A. Paterson  
Loriss B. Stewart  
C. A. Chant  
Albert D. Watson  
Committee

*Loane*

Sent to City Hall, Friday May 8  
Parks Committee meets Tues. May 12  
Board of Control meets in a day or two

Dr. Watson and I visited the City Hall on Tuesday, May 5.

We met F.S. Spence, a member of Council, who was very favourable to our proposals. Also we met J.O. McCarthy, vice-chairman of the Board of Control, and explained to him that Com'r. Chambers was somewhat worried over his department assuming the cost of the plot of land; he said the Board would look after the financial end of the matter.

#### University Federation and Astronomy

In the scheme of University Federation the central body, namely, the University Professoriate, undertook to do the teaching of Science, of which assuredly Astronomy is a branch; hence our proposal to secure an observatory was of direct interest to the federated colleges. In this connection I had a conversation



with Dr. Nathaniel Burwash, the President of Victoria College. Under date June 18, 1912, Dr. Burwash sent to me the following statement:

Professor Chant has been conversing with me with reference to an Astronomical Observatory in connection with the University and the city of Toronto, and saying that he proposed applying to the city for a site on the high lands north of the city for that purpose.

There is no doubt that an institution of this kind in connection with Toronto would do very much for the reputation of the city, and also for the perfecting of work in connection with the University. The great difficulty in the past has been the smoke of the city rendering it quite impossible to do work at any point near the horizon, but on the heights above the city this difficulty would be obviated, and I am sure that our men of wealth could not do better than further such a project as this, and that it would be of great advantage to the reputation of the city, as well as advancing the cause of science in connection with our University.

*advancing*

#### Delay in City Council

Our proposal was approved by the Parks Committee and sent on to the Board of Control for further action,

Under date August 18, 1914, Mr. Chambers wrote to me: "....I do not think the acquisition of a park to serve the Wychwood District should interfere in any way with the Observatory project, but I am doubtful if under the present somewhat straitened financial conditions we will be in position to take over the proposed site this year."

By this time the first World War was upon us and there seemed little hope of obtaining funds for the erection of the observatory in the near future.

#### Architects' Sketch Plans

Early in 1915 the Committee authorized Dr. Watson and myself to consult Sproatt and Rolph, the well-known architects, about drawing sketch-plans of our proposed observatory, which we might use in our campaign for funds when the opportune time should come. We were cordially received at the architects' office and



were informed that there would be no charge for the work. I had made some notes and sketches which I showed to Mr. Sproatt, and he suggested that I should make a list of the rooms with their purposes which we would require, and he would see how best they could be provided. Mr. Sproatt and Mr. Rolph met me at the site on March 1, 1915, and we discussed just where the building should be located and I left the rest to them.

On June 25 the firm wrote that the plans and elevations were complete and asked what title they should place on them. After some consideration we chose "Royal Astronomical Observatory, Toronto."

I was highly pleased with the clever arrangement of the two floors and thought the elevations charming. It was suggested that the building be of brick covered with stucco, which we thought would be in keeping with the location. I had photographs and lantern slides made of the plans, which I intended to use on every appropriate occasion. Especially in my University Extension lectures throughout the country I would refer to the great need of the University of Toronto of an observatory and these slides would illustrate what we wanted.

#### After the War; a Fresh Campaign

At last the war was over; it had been a long, painful experience to me. I had been accustomed to the quiet days of Queen Victoria. I felt it would be a relief to begin again our campaign for an observatory.

I was invited to address the Electric Club which met at the Prince George Hotel. The meeting was on Friday, February 21, 1919, and the subject I chose was "Recent Developments in Astronomy" The president, D.H. McDougall, was in the chair, and F. Kennedy of the Bell Telephone, was secretary.



I spoke chiefly on the radial velocity of the stars, i.e., their speed, far out in the depth of space, towards us or away from us. Its determination is based on Doppler's Principle which was clearly stated, referring to sound waves, in 1848; but the measurements with light-waves from the stars are extremely delicate and difficult to make. Progress was slow until the photographic plate was applied to the problem. Photography of the stars was definitely put into practice in 1887. In 1893 W.W. Campbell, of the Lick Observatory, undertook to measure the radial velocity of all the stars bright enough for his purpose, about magnitude 5. He designed his own spectrograph, which was paid for by Mills, of the observatory's board of trustees. It took twenty years to complete his task, which included the sending of an expedition to the southern hemisphere to photograph the stars which could not be reached from California. He observed about 1100 stars, each one several times. The ordinary radial velocity was found to be about 20 miles per sec., but one was discovered with a velocity of 150 miles per sec.

After thus mastering the stars the spectrograph was applied to the nebulae and some of these objects were actually found to have radial velocities of 1000 kilometres a second. Such results caused us to revise radically our views on the nature of our universe. Some of the nebulae are probably comparable to our entire Milky Way.

In closing my address I called on my hearers for support in our effort to obtain an observatory for the City, the University and the Astronomical Society. What we most needed, I said, was some person of means who would supply the funds for a worthy memorial to one who has given his life for his country, or to one who has been spared to return safely to his friends.



The members of the Electric Club were enthusiastic in appreciation of the lecture and the newspapers gave considerable space to it, with prominent headlines referring to our endeavour to secure a great observatory.

#### The Mayor and the Board of Control

Under date May 27, 1919, as Convener of the Committee, I wrote to the Mayor and the Board of Control as follows:

In the early part of the year 1914 a project was put forward by the Royal Astronomical Society of Canada for the establishment of a high-class astronomical observatory in the City of Toronto. It was proposed to afford observational facilities to the Society, to the University of Toronto and to the citizens in general.

Some preliminary consideration was given to the matter by the Board of Control, but before definite action could be taken, the outbreak of the war prevented further progress.

Feeling that such an institution would prove a most valuable asset to our city, the Committee desires permission for a deputation to wait upon the Board in order to present fuller details of the project.

To this the City Clerk, on June 7, 1919, replied:

Replying to your communication of May 27th. ult., I beg to advise you that the Board of Control will be pleased to receive a deputation representing the Royal Astronomical Society at its meeting on Wednesday next, June 11th. inst. at the hour of 10 o'clock a.m., re proposed establishment of a high-class astronomical observatory in the City of Toronto.

#### Meeting of the Board of Control

A large deputation, led by A.F. Miller, president of the Royal Astronomical Society, met the Board of Control at their meeting on June 11. It was a very representative body of citizens and included: Rev. T.C.S. Macklem, Provost of Trinity College; Dr. Albert D. Watson; Dr. James L. Hughes; Professor Alfred Baker; Sir Frederic Stupart; John A. Paterson, K.C.; Capt. H.A. McTaggart; and many others.

I had prepared a memorandum entitled "An Observatory for Toronto," and a number of copies had been made for the members of the Board and for the Press. I had also some photographic prints of the elegant sketch plans made for us by our architectural friends,



the estimated cost of the building being \$150,000. Using these I outlined the need of the city for a first class astronomical observatory.

The Mayor (T.L. Church) wondered if this was not a provincial responsibility, but Controllers Maguire, McBride and Cameron thought the City should not fail to take advantage of this opportunity. The Mayor said we had made out a good case.

It was requested that a committee should be chosen to confer with the head permanent officials of the City to work out the details of an agreement between the Society and the City, and report to the Board of Control.

In reporting the visit of the deputation to the Board of Control the city newspapers gave much space, including some sketches of the proposed building. The Toronto World and the Times printed my memorandum complete, and there were strong editorials commending highly the project of the observatory.

#### Memorandum - An Observatory for Toronto

To the preparation of this memorandum I gave much thought and I think it worth recording as a historical document.

One of the outstanding needs of the city of Toronto at the present time is a first-class astronomical observatory. For many years there have been persistent requests from our citizens for the privilege of observing through a large telescope the various bodies in the sky; the University of Toronto urgently needs facilities for practical instruction and for research in astronomy; and the Royal Astronomical Society of Canada is hampered in its work through the lack of a suitable place where it may put at the service of the public its valuable library and the instruments which it possesses.

These wants have not developed in a day, but have been felt for a decade. Early in 1914 a committee was appointed by the Astronomical Society to consider the question of obtaining an observatory, and the chief provisions of its report were the following:

1. That the city should furnish the site.
2. That the University should maintain the observatory.
3. That the Society should have accommodation for its library and its instruments.
4. That the observatory should include in its equipment a



large telescope of aperture 20 inches and a smaller one of aperture 9 inches; the former to be at the disposal of the public at stated times (Saturday evenings) and the latter to be ready for use by amateurs at all times.

Let me discuss briefly these proposals. There is a suitable site included in property owned by the city on Bathurst St., above St. Clair Ave. It is suggested that the whole property be incorporated into the city's park system and a sufficient portion of it be allotted for the purposes of the observatory. It is intended that the building shall be architecturally fine and this, with many other features to interest the visitor, should make the park a very attractive place.

It is the duty of the University not only to give instruction in astronomy, but also to carry on a serious program of astronomical research and thus extend the bounds of our knowledge; to do this, however, it must have the proper means. I know of no University, comparable to ours in size or importance, which does not possess a better equipment for practical astronomy. Yet this is essential, as it is only by actual observation that a living interest in the universe about us is aroused. Some may be inclined to say that astronomical investigations have slight practical application, but such criticism is due to a lack of comprehension. Astronomy has many direct practical applications, such as in determining time, in supplying fundamental information for the surveyor and the mariner, and in settling questions of chronology. Then I might refer to the extraordinary history of the gas helium which was discovered through observations at a solar eclipse; but in addition to all this, the discoveries in astronomy have powerfully influenced the development of man's intellect. It may well be placed along with good literature, good music and the fine arts. They are important factors in evolving a noble type of civilization. They extend our horizon, broaden our sympathies and make life much more worth living.

The Astronomical Society during the last thirty years has been accumulating a library which is now of considerable value; and it has acquired a number of instruments, chiefly by donation. It is anxious to secure a suitable place where these may be made available to the citizens.

But it does not require great mathematical talent or special scientific ability to enjoy many of the beauties of the universe, and experience has shown that when a suitable opportunity is offered, the people will seize it. Let me give two instances. The Lick Observatory, on Mt. Hamilton, Cal., has brought distinction to the name of its founder and to the state in which it is located. To reach it one must travel 25 miles up a mountain road, and the time and expense are considerable, yet each year about 5000, from all parts of the world, visit it. The institution is open to the public every day, but on Saturday evenings the staff entertain the visitors and permit them to use the instruments. But a still more striking illustration is at hand. One of the best-known makers of telescope lenses and mirrors in the world is John A. Brashear, of Pittsburgh, Pa. While working in the rolling mills he made his first lens and mounted it into a telescope, and he has been trying ever since to provide opportunities for others to study the heavens. Some years ago he was chiefly instrumental in raising the funds for a splendid new observatory, and one of the features of it is a telescope continually open to the public. The number of those using the privilege is astonishing. I have been furnished with the



statistics: - 1909, 1620; 1910, 2779; 1911, 1817; 1912, 2410; 1913, 2588; 1914, 3278; 1915, 3941; 1916, 4290; 1917, 3373; 1918, 2957. Total for 10 years, 29,023. Dr. Brashear, in a letter dated April 21, 1919, says: "May I say that, while I have been interested in scientific work for nearly half a century, and have done my best to bring the beautiful things in science to the comprehension of the laymen - yes, to the boys and girls - in lectures, etc., nothing outside of my purely educational work has given me so much pleasure as the free department of our observatory, - the realization of a dream of my later childhood. The demand is as great as ever for admission to see the beauty of God's universe, and apart from the scientific side, its high moral worth counts every time and all the time."

I have had some connection with the Boy Scout and Girl Guide movements and the constant demand from these active boys and girls is to view the heavenly bodies through a telescope. The teachers in our schools, as well as their pupils, are ignorant of the wonders of the universe, chiefly because they have not been introduced to them. A good observatory would be a splendid addition to the educational institutions of our city and of the province.

As I have already stated, the proposals outlined above for the establishment of an observatory were drawn up in 1914. First, they were approved by the Council of the Astronomical Society. Then they were presented to the Parks Committee and were endorsed by them. The Board of Governors of the University also expressed approval. Then the war broke out and the active campaign had to be given up. However, the Council of the Society, in order to put its proposition in more definite form secured from an eminent firm of architects sketch plans of the building. These provide for a handsome and commodious structure, well adapted to the varied needs of all parties. I shall be pleased to give further information regarding them.

I have no hesitation in saying that this is a unique opportunity for doing a great service to the entire community. The person of means who will supply this great need will confer peculiar benefit upon the University, the Astronomical Society, the teachers, their pupils, and especially the citizens generally; and at the same time he may bring lasting honor to his own name, or to that of one who may have died for his country, or possibly to that of one who was spared to return to his native land again.

#### Agreement with the City

The committee asked for at the end of the visit of the deputation to the Board of Control on June 11 was appointed as follows:

For the Astronomical Society:

A.F. Miller, John A. Paterson, J.R. Collins.

For the University:

A.T. DeLury, J.C. Robertson, C.A. Chant.

This committee had a conference in the office of T. Bradshaw,



Commissioner of Finance, on July 9, with the following city officials: Commissioner of Parks, City Solicitor, Assessment Commissioner, Commissioner of Finance.

I presented a draft of conditions for holding the site for the observatory. It was discussed freely and with a few verbal changes was approved unanimously. The joint report of the City Officials was then sent on for presentation to the Board of Control at its meeting on August 6. I did not hear anything further on the matter for three months, and wrote to the Commissioner of Parks to ask what had happened, and under date November 12 he replied:

No action was taken by the Board of Control upon receipt of this report, as I understand they are awaiting definite word from the Astronomical Society with respect to the grant which the Society expected to obtain from the Ontario Government towards the cost of the erection of the buildings.

As a matter of fact the Astronomical Society had not approached the Ontario Government on this matter.

On November 24, A.F. Miller, John A. Paterson and I interviewed Commissioner Chambers and he suggested that we see Mayor Church and arrange for a meeting with the Board of Control; and two days later, on November 26, Mr. Miller and I went to the Board and asked them to consider the report of their committee. After a brief discussion it was accepted unanimously.

The report was approved by City Council on Thursday, December 4, 1919.

#### Terms of Agreement with the City

The text of the report accepted by the Board of Control on November 26, 1919, and approved by the City Council on December 4 is as follows:



### Terms of Agreement

1. The City shall dedicate the property as a park for the citizens.

2. The north-easterly portion, comprising approximately three acres, shall be leased for one dollar per year to a Board of Trustees, composed of the Mayor of the City, the President of the University and the President of the Royal Astronomical Society, the lease to run for 42 years, and thereafter to be perpetually renewable for 21-year periods, at the same rate.

3. This Board shall facilitate the erection thereon, within ten years, of an astronomical observatory, according to plans which shall be approved by the City Architect and the Commissioner of Parks.

4. Should the land and buildings cease to be occupied by the Royal Astronomical Society and the University of Toronto, for the purpose herein specified, the same, together with all improvements, shall thereupon revert to, and become the property of the City, without any cost or charge, and may be used by it for such purposes as may then be determined.

5. The City shall maintain the park, and also any portion of the site allotted to the observatory, which is not in actual use for the purposes of the observatory, the citizens being allowed the use of this unoccupied portion on the same conditions as obtain for the rest of the park.

6. No fence shall be erected upon the property, and no physical change shall be made thereto without first having obtained the consent of the City.

7. The University shall maintain the observatory. The government of it shall be vested in a Board of Management consisting of seven members. The professor of astronomy in the University shall be ex-officio chairman of this Board, and three members shall be nominated annually by the Board of Governors of the University, two by the Council of the Astronomical Society and one by the City.

8. The citizens shall be admitted to the observatory on conditions to be approved from time to time by the Board of Management.

9. The Royal Astronomical Society shall be provided with accommodation for its library and for the storage of its instruments in the building.

10. The Society shall maintain the library and shall allow the citizens to use it on conditions similar to those of the Toronto Public Library.

11. The Society shall have accommodation for its regular and general meetings, and on other occasions as approved by the Board of Management.

### Progress with our Programme

By the end of 1919 I felt we had made real progress. The beautiful site which we had been endeavouring to secure for several years had been definitely allotted for our purpose by the City Council. This led us to work harder to obtain the funds for the observatory building. I aimed to keep the matter before the pub-



lic until we should succeed. We had lots of friends very willing to help in our campaign.

C.A. Biggar, of Ottawa, Assistant Superintendent of the Canadian Geodetic Survey, was much interested in our project and wrote to support it. He described how the citizens of Ottawa came in large numbers to the Dominion Observatory on visitors' hours. The letter appeared displayed in a 'box' in the Globe on December 25 1919; and on January 16 in the same newspaper, appeared a well-informed and strong editorial on the matter.

On March 16, 1920, there appeared in the Mail and Empire from Otto Klotz, Chief Astronomer and Director of the Dominion Observatory at Ottawa, a strong letter commending highly our project in Toronto. He concludes: "To my mind, it should be a privilege to become a public benefactor, such as is offered in the present instance. We Canadians have measured up to full stature in recent years; let us measure up to the present opportunity."

I think we did our duty reasonably well in trying to keep our efforts before the public, and the newspapers gave us generous assistance. I wrote a number of short articles, usually with an astronomical "text" and at the end urging support of our observatory scheme, which I hoped might find their way on the editorial page. One of these I sent to J.R. Bone who was Managing Editor of "The Star", and on February 12, 1920, he wrote that he had shown my "copy" to Mr. Atkinson who was much pleased to have it used as an 'editorial'. On April 24, 1920, the "Star Weekly" published an extended description of the Lick Observatory in California which I had written. Its bearing on our project was evident.



Whenever a noted astronomer came near Toronto I tried to secure him for a lecture, usually before the Astronomical Society and the University. Almost always he would have an interesting story to tell and would have a good audience. Generally he would stop at my house.

To help us in our campaign I wrote to E.B. Frost, the director of the Yerkes Observatory of the University of Chicago, and asked if he would come to our assistance by giving a lecture. He was quite willing, but advised me to secure E.E. Barnard, who was a member of his staff and who had achieved fame as a discoverer of comets and for his unrivalled photographs of comets and of the Milky Way.

It was arranged that he would address the Empire Club at noon on March 25, 1920, and in the evening would give a lecture on "Photographic Revelations in Astronomy" under the auspices of the Royal Astronomical Society and the University of Toronto. In both cases he would use lantern slides to illustrate what he had to say.

Barnard's visit to Toronto was greatly enjoyed. Both of his addresses were distinguished successes. The room at the King Edward Hotel for the Empire Club luncheon was full of members and their guests. The windows had to be darkened in order to use the lantern slides, but they were clear and the speaker could be understood. In the evening the large lecture room in the Physics building was crowded. Professor Barnard - he was 64 at the time - was instructive, entertaining and indeed charming in his simplicity and directness. His lantern slides were usually made from his own negatives which often had required exposures of several hours at a low temperature and with the eye under strain in guiding the



telescopic camera. When the picture was thrown on the screen Barnard spoke with a certain familiarity and sureness of knowledge very pleasing to the large audience. He ended his lecture by expressing a wish that Toronto would soon possess a big observatory of her own. Barnard died Feb. 6, 1923.

#### Helpfulness of President Falconer

I should like to express my appreciation of the helpfulness of President Falconer. Just before our big delegation went to the Board of Control (June 11, 1919) I received the following letter:

June 10th, 1919

Dear Professor Chant:

As you are aware, I am thoroughly in sympathy with the movement that you are making to secure from the City a site on which an observatory may be erected, and as far as I can judge the site that you propose is very suitable. You know that the Board of Governors has been in sympathy with your project and I hope you may be successful.

Yours sincerely,

Robt. A. Falconer, President

Two years later, the following letter was received:

Nov. 4th, 1921

Dear Professor Chant:

I have read with interest your booklet dealing with the Astronomical Observatory and I hope that it will bear fruit. Any service I can be to you I shall be happy to render.

Yours sincerely,

Robt. A. Falconer, President

#### Indebtedness to George E. Hale

I was also indebted to George E. Hale. As everyone knows, he was responsible for the building of the Yerkes and the Mount Wilson observatories, and especially, in more recent years, for the Mount Palomar 200-inch telescope, which appropriately bears his name.

In a letter to him dated May 1, 1920, I sent photo-copies of the sketch-plans for our proposed observatory, and I also asked about a tower telescope, which I believe he originated. Under date May 19 he answered my questions, and he also offered me the



following advice:

The problem of raising funds is of course difficult, especially at the present time when there are so many demands from all directions. In my own experience, I succeeded in securing funds for the Yerkes and Mount Wilson Observatories only after repeated failures. In fact there is a very large element of chance in such cases, and the only way to succeed is to continue the search until the right person turns up. This may take many years, but the way to begin is to prepare a well-defined and attractive plan, as you have done, and to place this before possible donors whenever opportunity affords. You are fortunate in having a good site and in getting the University to agree to maintain the institution.

(Remark by C.A.C. in 1953. - I can only say, how true it all is!) Hale died in 1938.

During 1920 I approached some of our men of means regarding the building of the observatory, but they all stated that they were unable to undertake it. I might refer to Col. R.W. Leonard, of St. Catharines. He was a well-known mining man, a graduate of the Royal Military College, he had a high sense of duty and was very generous. He was a member of the Board of Governors of the University and came to see me. He was very favourably impressed with my project, but said he was not able to offer any material support.

#### Winnecke's Comet

Much interest was aroused by the visit of a faint comet in the spring of 1921. Originally it had been discovered by Pons, at the Marseilles Observatory, on June 12, 1819. Its orbit was computed by Encke who predicted that it would return in 5 - 6 years. Actually it was not seen again until 1858 when on March 8 it was rediscovered by Winnecke of the Bonn observatory. The comet was a faint, gauzy object without any marks to distinguish it, but when Winnecke computed its orbit in space it was found to be the same as that of Pons's of June 12, 1819. (It may be remarked that Pons discovered 37 comets in all).

However on close examination it was found that the path had become a little larger and its period slightly longer.



Between 1858 and 1921, or 63 years, the comet visited the sun eleven times and it had been seen on eight of these returns, escaping detection at the other three. On the 1921 return it was re-discovered by means of photography by Barnard at the Yerkes Observatory on April 10. Having taken a few more observations then for position, the orbit at that time was computed. It was found that the comet would reach its perihelion on June 13 and about 7 days later it would arrive at the plane of the earth's orbit and would pass from the north side to the south side of the earth's orbital plane. But the earth does not get to this point in its orbit until June 30, by which time the comet was well out of its way. The two bodies were actually nearest about June 15 at which time they were about 10,000,000 miles apart.

Why had this insignificant little comet aroused such interest on this return? On previous returns the earth had been in some distant part of its orbit and the comet never got near us. But about the end of 1920 Crommelin, an able English astronomer, on investigating this comet, saw that it would arrive at its node just about the time the earth would be there. He found that the comet's distance from the sun had been constantly increasing, and that as nearly as he could estimate it would be at the same distance as the earth, and therefore circumstances were suitable for a collision. However since the re-discovery it was found that it would miss the earth after all.

In order to make clear the motions of the earth and the comet I had a model constructed. There was a brass ball to represent the sun, placed at the centre of a circle of brass wire a foot in diameter, which represented the orbit of the earth. The comet's orbit was an ellipse about  $3\frac{1}{2}$  ft. long, made from



stiff wire, and it was mounted in position so that the sun was at one of its foci and its plane made an angle of about 19 deg. with the plane of the earth's orbit. The model was supported on a tripod which stood on the table.

About the end of May I gave a lecture in the Physics Building on Winnecke's Comet. I had written three articles which were printed in the newspapers on March 24, April 9 and May 28. I had some lantern slides to show and also my new model. There was a big crowd and I think they understood why there <sup>had been</sup> ~~was~~ fear of a collision of the comet with the earth and why it did not take place. I also showed my slides of the proposed observatory and made an appeal for funds.

After the lecture a gentleman came up to speak to me and said he was interested in my project. He told me his name was David Dunlap.

#### The Time out of Joint

In late spring of 1921 I revised my memorandum on An Observatory for Toronto and had it printed as a booklet convenient to enclose in a letter. The first copy I sent out was to Col. Leonard, who, as I have remarked, said he could not then materially help.

In November I sent a copy to each member of the Board of Governors of the University, of whom there were 23 in all. Several of the members acknowledged the receipt of the booklet, but they did not give me much encouragement. Everybody was very cordial in wishing me success in looking for funds but they thought the time was inopportune.

The Chairman of the Board of Governors was Sir Edmund Walker, who was President of the Canadian Bank of Commerce, and I quote his



kindly letter:

Toronto, 10th November, 1921

Dear Mr. Chant:

I have your letter of 2nd. instant. I have examined attentively the pamphlet enclosed therewith and needless to say I agree with everything you say as to the necessity of establishing a properly equipped astronomical observatory, both in the interests of education and the science of astronomy. I fear however that I cannot help you by suggesting any person likely to make such a gift at the present time; indeed, I have never known a less favourable moment. Those who have been liberal in Toronto heretofore are at the present time made to pay supertaxes on income which in every case within my knowledge have swept away the source from which donations have hitherto been made to any worthy cause.

Yours faithfully,  
B.E. Walker

Professor C.A. Chant  
University of Toronto

That letter made me pause; and several other members of the Board, including my college-mate H.J. Cody and my esteemed friend Vincent Massey, expressed similar views, and made me consider seriously what I should do. But I could not toss aside my observatory project. Perhaps in a few years financial conditions would change and money for a good cause would flow again more freely. I had not forgotten David Dunlap's expression of interest.



### 3. Difficult Years: Big Mirrors

#### The Trip to Australia

At this time I was engaged on another difficult undertaking. On Sept. 21, 1922, a total eclipse of the sun would occur which would be peculiarly favourable for making observations to test the Einstein Theory. Campbell of the Lick Observatory was taking a well-equipped expedition to Western Australia to observe the eclipse and had invited me to bring my Canadian party and go along with him. To get my apparatus constructed and tested was occupying all my spare time. I was taking my wife and daughter and I was joined at Victoria, B.C. by R.K. Young of the Dominion Astrophysical Observatory there. We left Toronto on June 7, 1922, and did not arrive back home until November 23, 1922, nearly six months later.

#### Three Letters from Mr. Dunlap

I received three letters from Mr. D.A. Dunlap. The first was dated June 7, 1921, a week after my lecture on Winnecke's comet. I wrote to him on June 3, asking him to become a member of the Royal Astronomical Society of Canada. I told him that Mr. A.F. Miller would propose him for membership when the meetings would be resumed in the autumn. Mr. Miller, I may say, was the Secretary of the Toronto General Hospital and was well acquainted with Mr. Dunlap. Mr. Dunlap expressed pleasure in accepting my suggestion and Mr. Miller's courtesy.

The second letter was dated Dec. 7, 1922, shortly after my return from Australia. I give the letter in full:



85 Bay St., Toronto,  
Dec. 7th, 1922.

Prof. C.A. Chant,  
201 Madison Ave.,  
Toronto.

Dear Dr. Chant,

I spoke to you the other evening at the Physics Building that I would drop you a line in order to get advice from you as to what book or books on astronomy I had better get to send to a beginner in that subject and which could be referred to if necessary when the party was in doubt as to what a star or a constellation might be.

When I was at Lake Temagami last summer I met a Mrs. Davis and her husband from Philadelphia and found her to be a beginner very interested in finding out and knowing the stars and constellations, with which we are more or less familiar.

I could only think of the book by Kelvin Macready on "Astronomy for Beginners" which I happen to have. I told him that you had then gone to Western Australia and on your return I would consult you before writing to her again on the matter.

Believe me, Dear Professor,  
Yours very truly,  
D.A. Dunlap.

In my reply, in addition to Kelvin Macready's book, I named seven others. Two of them, dealing specifically with stars and constellations, were: W.T. Olcott, A Field-book of the Stars (Putnams); and G.P. Service, Around the Year with the Stars (Harpers).

In regard to the people from Philadelphia, Mrs. Dunlap afterwards informed me that she and her husband had come across them scanning the sky in the endeavour to find the star Betelgeuse in the constellation of Orion. A short time before this the astronomers at Mount Wilson in California, using the method by Professor Michelson of Chicago, had been able to measure its diameter and found it to be 240,000,000 miles, or as big as the orbit of the planet Mars. The diameter of Arcturus in Bootes was found to be 19,000,000 miles. This star is prominent in the summer. I have looked up some old records and I find that in the Star Weekly for March 19, 1921, was a 'popular' article by me on the measurement of the star Betelgeuse. A more elaborate article on "The



"Latest News About the Stars" was in the Presbyterian Witness for Nov. 17, 1921.

My third letter from Mr. Dunlap was dated June 7, 1923, and was to acknowledge receipt of some literature on the Canadian Eclipse expedition to Australia; and to inform me that Mr. F. Davis of Philadelphia had received with thanks the list of books which I had prepared.

Before this I had learned with great regret that Mr. Dunlap's health was not good. A trip to the Mediterranean did not restore it, and he died October 29, 1924. He was born October 13, 1862.

### Difficult Years

The years 1923 and 1924 were difficult and progress was slow. When our architect-friends drew the sketch-plans for our proposed observatory I aimed at having a 20-inch refracting, or lens, telescope. The price quoted for it in 1906 was \$18,000; and the circular dome to go over it was \$8500. At the Dominion Observatory at Ottawa the chief instrument is a 15-inch refractor. Its price, in the same list, was \$10,570 and its 30-foot dome was \$5000.

If one desires to work with faint objects in the sky one should have a telescope with great light-gathering power. As the years passed, astronomical research was being more devoted to problems connected with the stars, and the demand was for reflectors or mirror-telescopes. A large mirror is less expensive than a large lens. Thus in 1922 we favoured a 60-inch mirror-telescope. The diameter of the 60-inch mirror is 3 times the diameter of the 20-inch lens and their light-gathering powers are proportional to their areas, i.e., as 9 to 1.

### Big Mirrors

To make a big mirror one requires a great disc of glass and



casting of this is a particular and expensive business.

Before the First War the discs for all the big mirrors in America came from France or Belgium, but after it these countries would not attempt a 60-inch disc.

The Ohio Wesleyan University at Delaware, Ohio, on June 8, 1922, gave to Warner and Swasey of Cleveland a contract for the mounting for a reflecting telescope to have a mirror of diameter 60 inches, and for a dome of diameter 55 feet. On May 23, 1923, Professor Perkins, who donated the money to provide the observatory (some \$200,000), at the age of 90, turned the first shovel of earth in the construction of the observatory building, which was completed in the autumn of 1924. The mounting of the telescope was installed in the spring of 1925. The machinery was finished but the essential part of the telescope - the mirror - was missing. A <sup>60</sup>~~66~~-inch mirror was loaned by Harvard University, for use until the Perkins mirror could be completed.

On June 8, 1922, also, the contract for the optical parts of the telescope, including the great mirror, was given to J.B. McDowell, Brashear's successor. McDowell died in December 1923 and no disc of glass for the 60-inch mirror had been made. An appeal was made to the Bureau of Standards at Washington to undertake the making of the disc and the Bureau actually began to do so; but on a protest from an American firm it desisted - for a time. The Spencer Lens Company at its glass works at New Hamburg, N.Y., attempted to produce a disc by forming a pile of plates of glass and then fusing them together, as in bi-focal spectacles; but this interesting experiment failed. This firm hesitated to build new works to melt enough glass, say two tons, at one operation, with only one order for a disc in sight. The manager wrote



to me to ask if we could possibly order a disc and thus spread the expense, but we were not able to go so far. I believe the company got a new manager!

Then the Bureau of Standards resumed the work as an experimental project again. Before long a large disc was poured and with many precautions was allowed to cool. It seemed to be all right, but suddenly cracked. After some months of preparation a second disc was poured - and it failed, as before. This was repeated a third and a fourth time. For the fifth disc elaborate preparations were made. The mould was improved, and the pouring took place on May 7, 1927; and all manner of precautions were taken in the cooling of the disc. On Jan. 21, 1928, the mould was opened, and the disc was perfect! But the disc was about 70 inches in diameter, much larger than required for a 60-inch mirror.

Now a hole had to be made through the disc, a task requiring skill and care and patience. One about 8 inches in diameter was successfully drilled through it at its centre. Then it was delivered to J.W. Fecker, successor to McDowell in Pittsburgh. He found that it would make a mirror 69 inches in diameter, and on Feb. 13, 1929, was given the contract to make it.

When it was thus determined that the new mirror would be 69 inches in diameter, it became necessary to construct a new tube for the telescope. This was done by the dependable Cleveland firm, and by using electrical welding it was made lighter and stronger than the original tube. It was attached to the telescope in the spring of 1931. Finally on Dec. 14, 1931, the new mirror, weighing 3300 pounds, was installed in the new tube and the Perkins telescope was complete.

By that time the serious commercial depression was being felt over the country, and this led to an agreement between Ohio State



University and Ohio Wesleyan University for both to use the Perkins Observatory and share in its upkeep.



#### 4. Growth of the Department: a 19-inch Telescope

##### Growth of the Department of Astronomy

The most notable event in 1924, as far as I was concerned, was the coming of Dr. R.K. Young to the Department of Astronomy of the University of Toronto. He had been with me in Australia to observe the 1922 eclipse, and on the way home, just before we reached Victoria, near which is located the great Dominion Astrophysical Observatory, I asked him if he would accept an appointment to the staff of the University if it could be arranged. He was willing to do so, and his appointment was effective in the autumn of 1924.

Young's old home was at Binbrook, in Wentworth county. He attended the Hamilton Collegiate Institute and the University of Toronto, graduating B.A. in 1909. Then he was a graduate student at the Lick Observatory, University of California, for three years, and after that held positions in Ottawa and Victoria observatories. He was the most capable and loyal of men, and in the years just to follow was almost indispensable to me.

##### The Eclipse of Jan. 24, 1925

On Saturday, Jan. 24, 1925, there was a total eclipse of the sun, in which the path of totality passed over thickly populated parts of Ontario, New York and Connecticut. Actually Stratford, Toronto, Buffalo and some other large towns were within the path - which was a rare occurrence. However Toronto was not far from the north edge of the 100-mile wide path. The hamlet of Long's Corners, four miles south of Hamilton and about fifty miles from Toronto, was almost on the centre line of the path, and Young and I decided to make our observations there. The total phase began there at 9.07 a.m. and lasted 70 seconds.



Although the prospect for a clear sky was poor we made elaborate preparations to observe the eclipse. It was a rare occasion and right at home. We constructed our apparatus at the University. Then, sometime before the event, we went to Long's Corners and laid out the precise place where each instrument would sit. About a week before the eclipse the University truck took the apparatus over and we put each instrument in place and adjusted it. After this our assistants came from the University and we rehearsed our program until it became perfectly familiar to us and we felt we would not make any mistakes at the time of the eclipse.

There had been a number of clear cold days which enabled us to arrange every detail, but on Friday night a storm set in from the west and the next morning thick clouds covered the sky and entirely hid the sun. It was a great disappointment!

But farther east, on the Atlantic coast, the sky was still clear, as the storm had not reached that part of its course; also, the sun was higher in the sky there and some valuable observations were made as well as photographs taken.

Exposure in the bitter cold weather gave me an attack of tonsillitis from which I did not become entirely free for several months. On Feb. 28 my wife and I and our friends Dr. and Mrs. Pakenham left Toronto to begin our long trip to Spain, Egypt and other countries. It was while in Cairo that a skilful Swiss physician gave me decided relief. We did not get home until Sept. 21, 1925.

#### Making a 19-inch Reflector

In the autumn of 1925 Dr. Young proposed that we make at the University a mirror of considerable size; and, if successful,



we might also construct the mounting for it. We believed we should find good use for the telescope.

Before this, Young had made several mirrors, the <sup>largest</sup> longest, I believe, being 12 inches in diameter. Now he suggested one of 24 inches, to grind and polish which would certainly test his skill.

The first thing to do was to get the disc of glass for the mirror.

When I was in England in the preceding summer I learned that Sir Charles Parsons was offering to produce telescopes of large size, including the supplying of the glass discs for the mirrors or lenses required.

Charles Algernon Parsons (1854 - 1931) was the fourth son of William Parsons, third Earl of Rosse (1800 - 1867), who completed in 1845 a metallic mirror 6 feet in diameter. William Herschel (1738 - 1820) about 1785 had made a reflecting telescope with a metallic mirror 4 feet in diameter, but he gave scanty information on the making of the mirror. Rosse solved his own difficulties and produced a mirror 6 feet in diameter, which brought him well-deserved fame. With it many details of the nebulae were revealed.

Charles A. Parsons invented the Parsons Turbine steam engine and applied it to the propulsion of ships which were driven at a speed never attained before.

After the First War the manufacturers of astronomical instruments were in difficulties, and Parsons bought out Sir Howard Grubb and Sons of Dublin and St. Albans, and established the firm of Sir Howard Grubb, Parsons and Co., for which he built new shops at Newcastle-on-Tyne, not far from his extensive steam turbine shops. He also became proprietor of the Parsons Optical Glass Co. of Derby.



On Jan. 5, 1926, I wrote directly to Sir Charles Parsons, at his London address. I asked him if he could supply a disc for a 5-foot mirror and if he could grind and figure it. Also, I asked if he could supply a disc for a 24-inch mirror which Dr. Young and I aimed to make at the University of Toronto. An answer dated Feb. 4 came from the new works at Newcastle, and gave the price for grinding and figuring the 5-foot mirror (£2700), but said their works at Derby were giving a quotation on the discs of glass. The word from Derby was that they had on hand a 24-inch disc. It was not entirely satisfactory, but they would send it to us if we wished, and we could return it if it did not come up to our expectations. The disc came, but we decided against trying to use it.

#### A Pyrex Disc

Then I wrote to the Corning Glass Works at Corning, N.Y., whose small pyrex discs were quite well known. They were willing to supply a 24-inch disc, but they would have to build a new mould and it would be some months before the disc would be ready. The price would be \$500. But the firm had on hand a disc which was rather rough in appearance but which would make a 19-inch mirror 4 inches thick. The price was, I believe, \$20.

We asked them to ship it to us, and it was received in March 1926. It was rough enough! The disc was half an inch thicker at one edge than at the other, and the sides were much seamed. There were many bubbles within the disc. Pyrex glass is very hard to melt and consequently is difficult to free from bubbles while being poured. But there were no bubbles of any size which would be near the finished surface and Dr. Young decided to use it.

#### Shaping the Disc

The first task was to shape the disc. This was done on a



a grinding table, with a rotating turntable in the centre, which Dr. Young constructed. With the use of a good supply of carborundum and some muscular effort, as well as mechanical skill and patience, the rough disc was brought to a perfect cylinder with a smooth surface <sup>all over it</sup> and with the two flat faces parallel to each other. Within two weeks of its reception this remarkable change had been produced. Then a hole 2 inches in diameter was successfully drilled through the centre.

After this followed the long and exceedingly careful fashioning of the surface of the mirror. The desired ultimate shape of the surface is a paraboloid of revolution, which, over a considerable area, differs very little from a sphere of the proper radius. The hollow was first ground out and made spherical in shape, which can be done in a mechanical way. Then by skilful grinding away the different zones it was changed into a paraboloid. This "figuring", as it is called, required months of labour and great skill, continually being guided by careful testing the surface. Finally it was polished.

#### The Mounting

Next the mounting was undertaken. The tube is of the open type. In every detail it was designed by Dr. Young and then it was made in our shop. The stand, or base, is a heavy hollow casting, and the wheels and gears are numerous and complicated; but they were practically all made by Dr. Young on his trusty lathe.

We had in our Department a gravity-driven clock by Cooke which we had used on our eclipse expedition and which could be used to drive the telescope, but gravity clocks give trouble in cold weather through the "sticking" of the oil. So Dr. Young designed and constructed an electrical clock, as invented by Gerrish



at Harvard College Observatory. This was a combination of motors and gearing, all controlled by a sidereal clock. The parts cost less than \$75, the main item being the motors, the rest being made in the shop.

### The Completed Instrument

The entire instrument when completed had quite a professional look. It was exhibited in the Ontario Educational section of the Canadian National Exhibition and attracted much attention.

For some time we endeavoured to find suitable housing for the new instrument, but no satisfactory accommodation could be secured. When the Dunlap Observatory was built it found its natural place in the south dome on the Administration Building, where it has been utilized in various researches.

### Printed Account of the Telescope

In the Journal of the Royal Astronomical Society of Canada for January 1930 (Vol. 24, p.17) is a 17-page article by R.K. Young entitled the Building of a 19-inch Reflecting Telescope. It is illustrated with 2 half-tone plates and 8 figures in the text including a line-drawing from a photograph of the completed telescope.

In his introduction Dr. Young says:

The present article is a description of the design and construction of a 19-inch telescope. It is published here because we think it should not be beyond the powers of the ambitious amateur to construct a similar or better one. It has been completed with the aid of a very modest workshop and occasional outside help for such work as could not be done on a lathe. It has taken about two years to construct, using only spare time in holidays and such time in the evenings and week-ends as available outside of university duties. The cost of material and incidentals was roughly as follows:-

- |                                                                                                              |           |
|--------------------------------------------------------------------------------------------------------------|-----------|
| 1. Optical parts purchased, including plane mirror,<br>finder lenses, eyepieces and disc for large mirror... | \$ 346.00 |
| 2. Outside work done, gear-cutting, patterns.....                                                            | 625.00    |
| 3. Castings, motors, bearings, incidentals.....                                                              | 529.00    |
| Total.....                                                                                                   | \$1500.00 |



When Albert G. Ingalls, Assistant Editor of Scientific American, was preparing his book entitled Amateur Telescope Making, Advanced, he asked permission to reprint Dr. Young's article. It thus has had a wide circulation and any amateur who has accepted the challenge to produce a similar fine instrument will have found assistance in reading Dr. Young's account of his experiences.



## 5. The David Dunlap Observatory - Looking for a Site

### An Observatory on the Hill

Being deeply interested in the progress of the 19-inch telescope did not cause me to forget our observatory project. I was not aware that there had been any improvement in the financial condition of our country, but I decided to keep the subject before the people.

In the "Star Weekly" of Nov. 27, 1926, appeared a prominent article entitled "An Observatory on the Hill - Why Not?" The 'hill', of course, was our fine site on Bathurst St., and I did my very best to present the case for a high-class observatory for Toronto. I discussed in some detail the needs of the University, the Astronomical Society, and especially the people of Toronto and the Province of Ontario. Before this I had shown the architects' sketches of elevations of the proposed building. From these elevations I got Mr. Charles Goldhammer, a young artist of the Ontario College of Art, to draw me an air-view of the building. He did it beautifully in charcoal and it made a very pleasing picture in the newspaper. Another illustration in the article showed a big refracting telescope at the Royal Observatory at Greenwich with W.H.S. Stevenson observing at the eyepiece.

### A Letter to Mrs. Dunlap

I was pleased with the article and I decided to send a copy of it to Mrs. Dunlap, along with a letter. It was upwards of five years since Mr. Dunlap had told me that he was interested in my project, and two years since he died. Had I missed my opportunity by not having had an interview with him? I did not wish to be too forward to take advantage of a kind word to me; and, a little later, I could not thrust any scheme of mine on a sick man!



So I composed a simple letter to Mrs. Dunlap. Before sending it I carried it up to the President of the University and asked him to read it. He did so, smiled and told me to go ahead. The text of the letter was as follows:

University of Toronto,  
Toronto, Dec. 7, 1926.

Dear Mrs. Dunlap,

Herewith I enclose a page from a recent issue of the "Star Weekly", containing an article written by myself, entitled "An Observatory on the Hill."

The first time I met your husband was on the occasion of a lecture I gave at the University, during which I outlined the project for securing a fitting observatory for Toronto. He came to me after the lecture and expressed great interest in our plans. From that time onward it was a pleasure to keep in touch with him and to find out how much attention he gave to the stars.

I had hoped that at some time he would be inclined to supply what we need so much; but - he passed away.

Since then I have wondered if you would be willing to consider the question of providing the observatory - or, if not the entire observatory, the great telescope - as a memorial to Mr. Dunlap.

I know you are almost overwhelmed with appeals of various kinds, but I think this matter is in a class by itself; and I hope you will pardon me for writing to you about it.

Very sincerely yours,  
C.A. Chant

To this letter Mrs. Dunlap replied:

Hillside  
Rosedale, Toronto,  
9th. Dec., 1926.

Dear Prof. Chant,

Among the many memories of my married life is the one connected with the study of the stars with Mr. Dunlap.

I distinctly remember his great interest in your work. What you said about the many appeals is very, very true, and many good causes lie on my desk to be considered.

Although I cannot just now promise definitely, I will assure you that I shall keep it in my heart for consideration, for it appeals to me tremendously, and in the meantime you can come and see me and inform me more regarding the matter.

I will be very much engaged till after Xmas but perhaps you could send me data through the mail.

Very sincerely,  
Jessie Dunlap

I was overjoyed; the goal was in sight!

On December 14 I wrote to say that I was greatly pleased to



receive her letter and to learn that she thought my proposal worthy of consideration.

As she requested, I enclosed in my letter some literature bearing on the subject. I included a booklet describing the Lick Observatory; a copy of the Journal of the Royal Astronomical Society containing an account of the great observatory in British Columbia, the great telescope of which was similar to one we should desire; also some photographic prints made from the sketch-plans drawn by Sproatt and Rolph, which however were only tentative. A few days later I sent a reprint of Barnard's lecture in Toronto in March 1920, and a publication describing the Chabot Observatory at Oakland, California, and its work for the public.

In conclusion I said that early in January I would call her on the telephone and find out when it would be convenient for me to go to see her.

#### First Visit to Mrs. Dunlap

It was on Jan. 12, 1927, that I first called on Mrs. Dunlap. I fear I was a bit nervous but she was very cordial.

She told me that the proposal to erect a great observatory as a memorial to her husband appealed very strongly to her.

She expressed the hope that she would be able to undertake the great project, but two or three years would have to elapse before the estate would be settled and she could enter actively on the work. Perhaps I should not wish to wait for her. I assured her that two or three years were as nothing in a great matter like this. I said that the great telescope would require three years in its construction.

Mrs. Dunlap said she would have to consult her legal adviser before any statement could be made public.



I told her that Dr. Young and I would collect all sorts of information, including the best site for the observatory, and would keep it all truly confidential.

We had afternoon tea in Mrs. Dunlap's lovely living room, and I left full of assurance that our long-hoped-for objective would be attained - and in grander form than we had expected!

Promise from Colonel Leonard

On Feb. 10 I called at 4 p.m. to see Mrs. Dunlap again, the time being arranged by her secretary. I wished to speak to her about a communication I had received from Col. R.W. Leonard.

Towards the end of December 1926 I sent to H.A. Collins, Colonel Leonard's secretary, a copy of my article in the "Star Weekly" entitled "An Observatory on the Hill". Some years before this I had approached Colonel Leonard in the hope that he might provide for the observatory but he was unable to do so. Hence, in sending the article I said I did not intend to ask Colonel Leonard again to undertake the great work, but I expressed the wish that if he were able he might read the article as I thought it would interest him. I said, further, that I actually had a prospect, but could not at that time say anything further about it.

In his reply Mr. Collins said he had read my letter and the article to Colonel Leonard who was distinctly interested and asked for further information regarding the proposed institution and expressed a wish to help in some way. I suggested that such an institution would require a library which could be maintained in an efficient condition by an endowment of \$25,000.

In Mr. Collins's reply, dated Feb. 1, 1927, he said:

Colonel Leonard is entirely in sympathy with the whole enterprise, and if it is considered by you, and also by the Board of Governors, that he could best assist by providing such an endowment fund, he has expressed his willingness to contribute the sum



of \$25,000, to be vested in the Board of Governors of the University of Toronto, and the income to be used in the purchase of books and works for the Library and in the general advancement of astronomical knowledge, all in accordance with the recommendations contained in your letter.

Now I was anxious to explain this whole matter to Mrs. Dunlap. I wished, also, to deliver to the President and the Board of Governors a communication giving explicit information regarding Colonel Leonard's promise without allowing it to be made public at this time.

What came from the Leonard Promise?

It may be as well for me to explain here what came of Colonel Leonard's promised donation. It was expected that the public announcement that a great observatory was to be provided for the University would be made within a reasonable time, and that legal evidence to that effect by the Board of Governors presented to the Trust Company which was handling Colonel Leonard's account would cause the sum of \$25,000 to be paid over to the University. But through the long delay in settling up the Dunlap estate, there being, I understand \$750,000 in legacies to be provided for, the actual public announcement of Mrs. Dunlap's gift was not made until December 29, 1930. Just a few days before that date Colonel Leonard died.

Now at Colonel Leonard's death there was not enough on hand in his account to pay the amount of the donation. If there had been, the manager of the Trust Company said he would have paid it, on an appropriate legal certificate. The solicitor for the Trust Company was also desirous of finding a way to pay it. But it was not mentioned in Colonel Leonard's Will, which indeed was so worded as not to have a residue to which things might be charged. It was suggested that the Board of Governors should enter a friendly suit



before a Judge, and I think that would have secured the verdict that the donation was a legal charge against the estate. Further, in Colonel Leonards Will was a legacy to University College; and, also, the University has an aversion to lawsuits!

I was greatly disappointed. I thought Colonel Leonard's promised donation was a noble response to the appeal I made in that newspaper article, "An Observatory on the Hill". His references to the project I had been advocating so long were very pleasing to me.

#### Mrs. Dunlap's Love of Astronomy

Mrs. Dunlap was very cordial, as before. She was in her big living room and a bright winter sun was shining into it.

I told her of Colonel Leonard's generous offer to endow the Library of the Observatory and she was much pleased. She spoke very highly of Colonel Leonard with whom she was well acquainted. They were both interested in mining matters.

Mrs. Dunlap told me that when she and her husband would go to New York he would take her down to 42nd Street to look through a street astronomer's telescope. She had been thinking about a memorial to 'David' and the observatory seemed to be ideal. She had mentioned it to Taylor of Queen's and Bruce Macdonald of St. Andrew's when they came to see her. They were greatly impressed. The latter thought it should be located near Yonge St., on the great highway leading to the north. She herself thought near Lansing, which is directly west of Donalda Farm which her son would inherit.

She asked about the Bathurst St. site, which she said she would go to see some day.

We had afternoon tea and I left at 5.05.

I was tremendously pleased! Mrs. Dunlap was simply wrapt-up in the project. She had not yet consulted her solicitor but she



would do so at once to see how the estate stood.

Mrs. Dunlap spoke about her dreams coming true; she was certainly making mine come true!

Next day (Feb. 11) I had a talk with President Falconer. He was highly pleased. I told him there was no doubt of our project being carried out, and in a worthy way. He thought I should be a happy man!

### Looking for a Good Site

On Tuesday, Feb. 15 (1927) I wrote to Mrs. Dunlap again. I enclosed in my letter a copy of the communication I had prepared to send to the President regarding the Leonard gift. In it I strove to give specific information without revealing too much at that time. I wanted her approval of it.

I wished also to tell her that Dr. Young and I had gone up to Lansing to look over the land, but that we had not found in the immediate neighborhood any site which impressed us favourably. Then we had gone back to York Mills and inspected the hill on the east side on which was the Anglican church, and after this the land on the west side of Yonge St. There we found a magnificent site on the height overlooking the valley to the south and Armour Heights on the other side of it. It was much more "commanding" than the site on Bathurst St.

Next day, Wednesday Feb. 16, I received a telephone message from Mrs. Dunlap at 3.20 p.m. and went over to Highlands Ave. to see her. She approved of my communication to the President regarding the Leonard gift, but she seemed a little perturbed that I had told him so much; however I said I simply had to do so and that he understood the conditions as to time, etc.

She said Mr. Holden, her adviser, had been to see her a few evenings ago and she told him what she had decided to do. He was



favourably impressed and approved the idea and no doubt would try to get funds as soon as possible. I spoke of the telescope requiring three years for its construction, and she said she would see if funds could not be secured for it.

As to sites, she had admired that occupied by the Church at York Mills, as well as some sites farther north. I showed on the map the site on the north side, on the high bank overlooking the ravine and Armour heights to the south, which I thought had a superb outlook. I mentioned another place on a bluff just west of where the great tall bridge now is. This, I understood belonged to the Sweny estate.

As indicating how fearful of delays and how earnest she was in carrying out this great project, she stated to me that if the observatory was not completed before she passed away she would leave enough in her Will to carry it through. I told her it surely would be completed and in operation long before that time.

#### More about Sites

On March 12 (Saturday) Young and I went to York Mills and inspected the Sweny property again. We thought it fine. On March 14 I visited the City Surveyor to see if one could get a map of this property and two days later I received a blue print from him.

On Friday, April 1, 1927, Mrs. Dunlap called for me and we drove to York Mills and inspected the sites, especially that of the Sweny estate. It was arranged that she, Mr. Holden and I should meet to discuss conditions. Holden and I were to look at this site. On leaving she expressed the wish that she could have a picture showing how the observatory would look on that hill!

But we found that there were other hills!



On Monday, June 27, on a telephone message from Mrs. Dunlap Grant and Bessie in their car drove me out to Donalda Farm. I left a map and photographs of Lick and Yerkes Observatories. Mrs. Dunlap said she was to see Mr. Holden on Wednesday. She said he was more hopeful of making progress on our project. I said I would be in England in the summer of 1928 and would like to discuss plans and details if the contract for the great telescope were given to Sir Howard Brubb, Parsons & Co. Mrs. Dunlap thought it would be under way before then.

Mrs. Dunlap took us all (in Grant's car) back through the Farm to a high point to see the view from it.

As time went on I supplied Mrs. Dunlap with pictures of observatories and other related literature. On Friday Dec. 30, 1927, Mr. Holden and I went to York Mills. He seemed favourably impressed with the Sweny property although we both thought the desirable site was not then easily accessible.

My little Book, "Our Wonderful Universe"

Just at this time I was revising the final proofs of my little book, which was published in London in the summer of 1928, and I wished to dedicate it to Mrs. Dunlap. On Jan. 3 I wrote about this and two days later called at 5.30 to talk it over. She was agreeable to the following:

TO

MRS. DAVID A. DUNLAP

A GENEROUS FRIEND OF ASTRONOMY

THIS BOOK IS DEDICATED

Mrs. Dunlap was very cordial and I stayed until 7 o'clock. She was keen to proceed with the big work.

When a new and enlarged edition of the book was published in 1940 this dedication was repeated and on the reverse side of the



leaf was shown a photograph of the David Dunlap Observatory which had been officially opened five years earlier, on May 31, 1935.

#### Farther north, looking For Sites

On Friday, May 18, Mrs. Dunlap called for me and we drove to Thornhill. We had tea at the Ladies' Golf Club, the grounds of which reached almost to Donalda Farm. She was Honorary President of the Club. We inspected a site on the north side of the Thornhill Golf Club grounds. It had a pleasing outlook southward over the Don valley occupied by the grounds; but it was "hemmed in" and not easy of access.

On May 25, 1928, I drove with Mr. Holden to Richmond Hill. On the way I drew his attention to an elevation about a mile south of the village and half a mile east from Yonge St. I had picked out this hill by the contours on a topographical map and had gone up to see it. He asked me if I would like to live up there among the clump of trees, and I answered without hesitation that I would. However we did not go up to see it, although we had inspected the Thornhill site.

#### A Sun-dial for Donalda Farm

On Wednesday afternoon, May 30, I took a sun-dial over to 93 Highlands Ave. It had been made from a design of my own. On its face there was cast a table giving the correction, for each day of the year, to be applied to the dial reading in order to get Eastern Standard Time (for the neighborhood of Toronto). Also there was cast on the face of the dial,

|      |      |
|------|------|
| DON- | FARM |
| ALDA | 1928 |

Mrs. Dunlap was pleased with the dial, which however was not mounted on its pedestal until the following year.



A Visit to the Richmond Hill Site

I told Mrs. Dunlap of my picking out a hill near Richmond Hill from the contour lines on a government map, and she suggested that we drive up to see it. So she called her chauffeur and she, Mrs. Mather, a visiting friend from Winnipeg, and I drove up to the farm. Turning to the right off Yonge St., we went the half-mile up the lane, and at the old barn Mrs. Dunlap and I got through a rickety wire gate and walked up to the top of the hill. She was delighted with the outlook in every direction and said "This is the place!" This site had a spacious and commanding view not possessed by any of the others; also it was conveniently reached from the University, being only ten miles from the city limits, along our great highway to the north.

That evening Mrs. Dunlap gave instructions to Mr. Holden to purchase the plot of land.

Seeking a Bargain in Land

Next afternoon I went to see Mr. Holden. He said he wanted me to go up and interview the owner of the property and get from him the price at which he would sell it. I protested that I was not an expert on real estate or on driving a bargain generally, but he insisted that I was the one to tackle the job. This parcel of land reached from the railway track eastward to the 2nd concession of Markham Township. Mr. Holden thought we should also possess the land west of the railway, which indeed originally was a part of the farm. This farm was numbered Lot 42 of Concession I, being one-quarter of a mile wide and a mile-and-a-quarter long, extending from Yonge St. to the 2nd Concession of Markham Tp.

So Dr. Young drove me up to see the owner of the farm. His name was Marsh. He was getting old and was anxious to dispose of



the place. He asked \$32,000. I had it in my mind that there were 140 acres, as I understood there were 50 acres in the part west of the railway. Thinking \$200 an acre was a reasonable price, I suggested \$28,000. This Mr. Holden approved and in the end it was accepted by the owner. When it was surveyed anew the area was computed to be 123 acres, and the price came out about \$225 per acre.

Until then I thought each of the five farms in our 1000-acre country blocks was exactly 200 acres, but this one (lot 42) was smaller.

As to the land west of the railway, which had been sold by Marsh when in financial difficulties, we were unable to make a bargain with the owner. I offered him a high price, which was 30 per cent. above what he had paid for it, but after a long delay it was not accepted. Then we offered an amount which was 63 per cent. above what had been paid. Also we informed him that the land was to be used for a public purpose, but the offer was declined. I may say our purchase of the east section included a right-of-way 66 feet wide over this west section. A couple years later we were informed that our second offer was acceptable - but it was too late!

#### We sail for Europe - 1928

Early in June Mrs. Dunlap, with her son and nephew, sailed for Europe.

On June 22 (Friday) my wife and I left Montreal on the ship Antonia. We proposed to attend the International Astronomical Union, in Leyden, July 6 - 12, then the Astronomische Gesellschaft at Heidelberg; and after this to visit certain places in Germany and Switzerland; and on our return to reach Quebec on Sept. 22.



I had asked Mrs. Dunlap to travel by way of Leyden and meet some of the astronomers, but I received a telegram from her in Lido (Venice), dated July 4 which read:

SORRY I CANNOT MAKE LEYDEN, TOO LONG IN ITALY,  
LEAVING FOR PARIS.

#### Asking for Prices of Instruments

Although we had not yet been permitted to order the great telescope and its dome, Young and I had made inquiries and actually had obtained prices. One of the firms to whom we had written was Carl Zeiss in Jena and in this case we had asked for a 60-inch reflector.

At the close of the astronomical meeting at Heidelberg, Jean and I took the long trip to Leipzig, in Saxony. We wanted to see the house I lived in and to have a meal in the Panorama Restaurant where I dined when I was a student thirty years before, on my first visit to Germany. I found the house BAUHOF STRASSE 1, looking very shabby. On the way we stopped off at Weimar where Jean stayed while I took a local train to Jena, some twenty kilometers away. I had a most interesting visit to the Zeiss works where we discussed telescopes and other things. Their chief engineer recommended that the 60-inch tube be rolled from sheet-metal, like a smoke-stack, not made open with lattice work, as usual in America. I had supper with Pettich, a much-travelled man, who had been in Toronto two years before this on the firm's business. He took me to the original Zeiss Planetarium, where Villiger, a member of the firm, lectured. Some 250,000 people had attended that Planetarium, which could seat 560 persons, although only 110 were present at this performance. They were all very courteous, and I was taken back to Weimar in a motor.



Back in England - Visit to Newcastle

We reached London on August 19 (Sunday), and on the evening of August 23 at 5.30 took the train for Newcastle-on-Tyne where we arrived at 10.38; and we put up at the Station Hotel. Next morning at 10 o'clock Cyril Young called for me in the Works car and drove to the Optical Works. Soon afterwards Parsons dropped in and we inspected the optical shop and other parts of the property. I had lunch "across the way" with the heads of departments, with Sir Charles at the head of the table. He insisted on a sharp knife to carve the roast of beef. He invited Jean and me to go out to his summer home at Ray, 25 miles in Northumberland on the road to Jedburgh. At 5 o'clock I went with Parsons in his car to the hotel where we picked up Jean and started out in a pouring rain. The estate at Ray comprised over 10,000 acres and the house and grounds were remarkable. We dressed for dinner and got to bed at 11.20. Next morning the estate car drove us to the local railway station where we took the train for Edinburgh and on to Glasgow where we arrived at 3.16 p.m., (Sat. Aug. 25).

After another month in Britain we sailed from Liverpool on the Laurentic on Friday, Sept. 14.

Mrs. Dunlap visits England Again

In 1929 Mrs. Dunlap with her son Moffat, her nephew Jack Dunlap and her niece Mrs. Hodge visited England. They sailed from Quebec on May 28, spent some weeks motoring in England, chiefly in the Lake District, made a short visit to France and sailed for home about July 6.

She expressed a wish to meet Sir Charles Parsons and to visit the Works at Newcastle. So I wrote ahead to Sir Charles and to Cyril Young.



I quote in full an interesting letter from Mrs. Dunlap written to me on June 16, 1929:

We have had a most charming twelve days in London. On our arrival we found cards and a note of invitation from Sir Charles and Lady Parsons. We dined with them a few nights after our arrival. They have a lovely house in Upper Brook St., and Sir Charles is a winsome, handsome gentleman of the old school. Sir Frank Dyson was there, too, and before I met him a note of invitation had come from him inviting us to see Greenwich Observatory and to tea afterwards. We were simply stunned with the magnitude of the place, and I found out why it takes so long to make a telescope. We were thrilled to the core!

At the dinner was also Sir Herbert Jackson, such a charming man. No doubt you know them all. And after all this enjoyment I want to thank you for it all.

I had a very kind letter also from the manager of the works at Newcastle, and Sir Charles offered to go up with me, but I have been so busy in London. To-morrow we leave on a motor trip to the English Lakes and Wales to be gone eight days. Moffat left yesterday for a two-weeks' visit with a Tutor at Lyme Regis. He has been accepted for Magdalen, Oxford, but must write an exam. in September. I am glad he is so keen. We go without him on this trip, but when he is through we go to Paris, and on to Switzerland.

You may be off to the Georgian Bay, so I will send this to the University to be forwarded to you.

I had so many things happening in my life before I left I feel I never properly thanked you for all the material you so kindly brought over for me to inspect. I shall see they are returned to you when I get back.

With our very warmest regards, appreciation and thanks for all you did to put these kind and gracious people in our lives,

I am most sincerely yours,  
Jessie D. Dunlap.



6. D.D.O. - The Telescope OrderedIn Motion at Last

On Friday, May 9, 1930, at 8.30 a.m. I received a telephone message from Mrs. Dunlap. She had had a talk with her legal adviser (Mr. J.B. Holden) who said matters were favourable and he wished to hear from me. I called him on the telephone, but could not see him until next week.

On Monday, May 12, I called Mr. Holden again, and went down to his office at 4 p.m. He gave permission to go ahead. Dr. R.K. Young was not in Toronto. He had driven to Hamilton to lecture to the Royal Astronomical Society there and had gone on to his old home at Binbrook. He was back on Wednesday, May 14, and he and I went to Mr. F. Jno. Bell, who was agent for Sir Charles Parsons's turbines and telescopes. We looked up prices and then cabled to Parsons for confirmation. He replied by cable.

The Order for the Telescope

I saw Mr. Holden and so did Mr. Bell who drew up the order for the 74-inch telescope. It was as follows:-

May 17th, 1930

Sir Howard Grubb, Parsons & Co.,  
c/o F. Jno. Bell, Esq.,  
Royal Bank Building, Toronto.

Dear Sirs,

Subject to formal agreement being approved by Mr. John B. Holden, please enter our order for one 74-inch telescope as follows:-

|               |                    |
|---------------|--------------------|
| Mirrors.....  | £ 7,000-0-0        |
| Mounting..... | 15,500-0-0         |
|               | <u>£22,500-0-0</u> |

Terms of payment to be arranged.

All prices are for delivery F.O.B. Newcastle-on-Tyne, England.

The foregoing to be in accordance with specifications and particulars submitted.

Yours very truly,

(Signed) C.A. Chant

O.K./JB.H.

J.B.H.



The order was not to be sent until it had been approved by the Donor who was in Ottawa at the time. As a consequence it was not cabled to England until Wednesday, May 21.

#### President visits the Site

On May 29 I saw Mr. Holden and he was willing that I should inform the Board of Governors that the great telescope had actually been ordered. He said also that he would like the President to visit the site.

On Saturday, May 31, the President, Sir Robert Falconer; the Superintendent of Buildings and Grounds, Col. A.D. Le Pan; and I drove up to the site in the University car. They were greatly pleased. On June 1 I wrote to Mrs. Dunlap about our visit and next day she telephoned that she was pleased.

#### Letter from Grubb-Parsons

Under date June 5, 1930, the Grubb-Parsons firm wrote to me from Newcastle:

We are very much obliged to you for your letter of May 17th, and thank you for placing the order for the 74-inch Telescope with us.

We expect to have several preliminary drawings ready to discuss with Dr. Young when he visits us about the middle of July.

Dr. Young had been invited by the firm to go to England to spend some weeks at Newcastle discussing details of the plans for the great telescope. He sailed from Montreal on July 4.

#### Letter from Sir Charles Parsons

I was greatly pleased to receive the following letter, in his own handwriting, from Sir Charles Parsons:-

1, Upper Brook Street, W.1.  
13 June, 1930

Dear Prof. Chant,

I greatly appreciate your kind letter and in reply need scarcely say how much we are honoured by the confidence you and the Donor have placed in us and that we will make every endeavour to justify it.



I will keep a lookout for Mr. J.B. Holden and we will endeavour to interest him during his stay in England, and I hope that he and Mrs. Holden may be inclined to spend a few days on the Northumberland moors and, if he is inclined, fish in the lochs.

I may add that we are starting preparations for the manufacture and figuring of the large mirror.

Pray excuse this hurried letter as I am leaving tomorrow for a week in Berlin, attending the World Power Congress.

Yours very sincerely,  
Charles A. Parsons.

### Announcement of the Observatory

Having ordered the chief instrument for the Observatory and at the desire of Mrs. Dunlap, I drew up a general description of our project. This I showed to Mrs. Dunlap at Donalda Farm on July 16 and it was approved by her. Next day I typed several copies and sent two to Mrs. Dunlap. I submitted it to Mr. Holden who also approved of it, but he was not yet ready to have it made public. He thought the statement as to site might have to be altered.

### Another Site?

On September 17 I returned to Toronto from our summer cottage at Go Home Bay and next evening went with Mr. Holden to Donalda Farm. The question had been raised regarding the nearness of the railway to the site near Richmond Hill and Mrs. Dunlap asked Dr. Young and me to look a little further for suitable sites. So we spent the next afternoon (Friday, Sept. 19) examining possible sites. These we asked Mr. Holden to 'look out for' as he drove north to his summer house at Shanty Bay on Saturday afternoon.

On Monday Sept. 22 I called Mrs. Dunlap in the morning and told her what we had done and at once she insisted on going up to see the locations we had picked out. At 3 p.m. Mrs. Dunlap, Jean and I drove up and examined Lot 30, Con. I, of Vaughan Township.



She was pleased at once and declined to go any farther. She liked it better than the former site and it was free from the railways.

However, further consideration of the Richmond Hill site, how much more outstanding it was and much more convenient to the University, led us not to pursue inquiries regarding the new site. But the public announcement of our project was still held in abeyance by Mr. Holden.

### Die Wunder des Weltalls

Bearing date November 30, 1930, Mrs. Dunlap wrote:

My Dear Professor Chant,

It was simply owing to the multiplicity of events in my life during the past week that you have not heard from me.

I was so pleased to receive the German copy of your book, it does look so learned! With the others it occupies a very prominent place on my Library table where yesterday I hoped it would be seen by all my distinguished guests.

Many, many thanks, and believe me to be

Most gratefully and sincerely,

Jessie D. Dunlap

### Announcement at Last

Under date Saturday, December 20, 1930, Mrs. Dunlap wrote:

Dear Prof. Chant

Thanks so much for the photos and the "Blunderland". Had a chat with Mr. Holden and he says we can now get together and discuss the Great Announcement.

What about Monday (Dec. 22) evening? If you can, get him also.

Always sincerely

Jessie Dunlap

We met on Tuesday, December 23, and soon agreed on the announcement. As given to the press on December 30, 1930, it was as follows:-

### A GREAT MEMORIAL

The important announcement has just been made that in the near future there will be established in the vicinity of Toronto an astronomical observatory which will rank with the world's greatest institutions of this sort. It will be erected by Mrs.



D. A. Dunlap and her son D. Moffat Dunlap as a memorial to the late David A. Dunlap, who died on October 29, 1924, and will be known as the David Dunlap Observatory.

Astronomy and geology were both favorite studies of Mr. Dunlap, but the former had a peculiar attraction for him. He was a keen student of the heavens and always liked to share his knowledge with others. This project has been under consideration for the last five years and will now be brought to completion. In working out the plans Mrs. Dunlap has had the assistance of Professor C.A. Chant, head of the Department of Astronomy of the University of Toronto.

The outstanding feature of the observatory will be a large reflecting telescope seventy-four inches in diameter. There is only one of greater aperture in the world, namely that on Mount Wilson in California. The instrument was ordered some time ago from the firm of Sir Howard Grubb, Parsons and Co., Newcastle-on-Tyne, England. It will be housed in a circular metal building, such construction being best for this purpose. The observatory building will be a beautiful structure in the classic style. It will be erected on a suitable site near Toronto in the midst of a large acreage which will be converted into a park to be known as the David Dunlap Park.

When the observatory is completed it will be under the Department of Astronomy of the University of Toronto, while the park will be developed in a scientific way by the Faculty of Forestry.

The new institution will bring distinction to the University, the city, the province and indeed the whole dominion. It will be an enduring memorial to a worthy citizen.

#### Memorandum for the President: Leonard Gift

As there had now been a public announcement of the project of the Dunlap Observatory I thought the time was opportune to secure the donation which Col. R.W. Leonard had promised for the maintenance of the library; and although I have already stated what was the final result, (see p. 802), I think it appropriate that I should give here the text of a communication which I sent to the President of the University within a week of the announcement in the newspapers. It was as follows:

Memorandum (Jan. 5, 1931). - I have asked the Bursar regarding the status of the gift of the late Colonel Leonard of \$25,000 for the maintenance of the Library of the new Observatory, and he informs me that the Toronto General Trusts Corporation stated the amount would be paid to the University of Toronto on request from the Board of Governors.

Now that there has been public announcement that the Observatory is to be established, I suggest that the Board formally



ask that the amount of the gift be transferred to them.

C.A.Chant

### The Great Dome and its Building

Having ordered the great telescope, it was necessary to consider the house to contain it. The circular building, or drum, is 61 feet in diameter. Its hollow wall has a steel frame, with heavy galvanized iron forming its outer and inner surfaces, which are two feet apart. The galvanized iron sheeting of the outer surface does not extend down to the concrete foundation but ends two inches above it. Thus air from outside can enter freely at the bottom, circulate in the wall and rise to the top, on which rests the hemispherical dome. The body of the dome has a steel frame with an outer and an inner surface, two feet apart, which are sheathed with agasote, a hard paper product. The agasate sheets on the outer surface are half-an-inch thick, those on the inner surface are three-eighths thick. The air can pass freely from the body of the wall into the body of the dome, circulate there and escape at the top of the dome.

By this means the interior of the building is kept cool during the day; and in the evening, when opened up for observations, the whole building soon assumes the temperature of the outside air. Thus heated air-currents are avoided. When such pass to the outside through the slit of the opened shutters they interfere with the "definition" of the telescope.

The cost of the drum was £6500. The agasote sheathing, imported from England, cost £700. On the outside of the outer surface of the dome is a covering of sheet copper as a protection from the weather. This cost \$5700. The total cost of the revolving dome was \$41,000.



The excavation for the foundation of the circular wall of the building and for the enormous pier for the telescope was made on the summit of the hill and necessitated the removal of two rock-elm trees which had grown up beside the line fence between the two farms comprising Lots 42 and 43.

As this excavation would reach a depth of 25 feet it was desirable to find out the nature of the earth comprising this hill. So a local well-driller was engaged to sink a small hole, into which he continually poured water. He reported that all the way down it was the same as at the surface, which I judged to be a clayey loam. It was thought the big pier might have to rest on a massive cement "float". But when the excavator<sup>who had the sub-contract</sup> had reached only a few feet<sup>down</sup> he found clay so hard and tough that he had to make use of a pneumatic drill, and he demanded extra pay. This clay, it was said, would be an excellent foundation for the pier.

The contract for the cement work was awarded to the Ramsay Contracting Co. and I thought it was especially well done.

The cost of excavation, the concrete foundations and the erection was about \$10,000, or about \$18,000 in all for the circular wall. The total for the telescope house was about \$59,000.

The contract for the fabrication of the Dome and Circular Building was signed on November 10, 1931, the contractor being the same as for the telescope, namely, Sir Howard Grubb, Parsons & Co. However the structural part was produced by the Cleveland Bridge Co. of Darlington, in Durham County, England, but the intricate gear for revolving the dome, moving the shutters and wind-screens, etc., was made in Newcastle. As shipped it weighed 210 short tons. It was loaded on the steamship Havtor in England and brought directly to Toronto harbour, where it arrived July



31, 1933. From the dock it was taken by truck to the site, fifteen miles away. The building had been erected in England and was speedily re-erected by the Dominion Bridge Co. of Toronto. To attach the galvanized sheets to the wall, inside and outside, some 32,000 little bolts were used.

#### Drawings for the Dome and Circular Building

The preliminary drawings for the dome and its circular building, made in England and sent to us in Toronto, were not very attractive. In the first place, the height of the wall was not nicely proportioned to the diameter of the dome. Then there were only eight windows and no portico nor pilasters. As finally worked out there was a handsome portico, numerous pilasters, fourteen windows and a well-designed gallery around the building near the top of the wall; and the completed structure presented a very pleasing appearance.

I always admired the dome of the 100-inch telescope on Mount Wilson and think that of the 74-inch, on its prominent hill-top, compares favourably with it.

The excavation for the foundation of the wall of the circular building and for the mighty cement pier for the telescope began in March 1933; they were completed in three months.

#### The Great Telescope

The telescope - all but the large mirror - was shipped from Newcastle by the steamer Cairnross. At Montreal it was transferred to freight cars which brought it to Toronto. Then it was carted to the site and erected by the Dominion Bridge Co. It was pleasing to see competent workmen performing a difficult job.

As one piece of the telescope, the polar axis assembly, weighed  $16\frac{1}{2}$  tons a special 20-ton crane with a boom 92 feet long



was erected to handle it. First, the housings of the bearings of the axis were carefully put in place on the north and south piers, and the axis was prepared. The driving and other wheels were placed on the south end; then when the large crane had raised the axis from the ground a second crane lifted one end until the axis was inclined to the horizontal at an angle of about 44 deg. (the latitude of the site). The heavier lower end was tied to the hook of the large crane so that the inclination of the axis should be maintained. Then the large crane raised the axis high in the air, passed it through the 15-foot slit of the dome and gently lowered it to the pier. The whole operation from leaving the ground until in its final position occupied less than an hour.

Then the declination sleeve, weighing 3 tons, was raised into position and bolted to the cubical portion of the polar axis. This was done on the morning of October 23. In the afternoon the declination axis, weighing  $3\frac{1}{2}$  tons, was raised and put in place. A workman from the shops in Newcastle was on hand to render assistance.

The Cairnross left Montreal on October 15, having on board the Pyrex disc for the great mirror, which it would deliver at Newcastle early in November.

### The Spectrograph

The spectrograph is really a separate optical instrument but it was specially designed to be used with this telescope and is always attached to it. Its object is to obtain photographs of the spectra of the stars. Its cost was about \$4000. As usual, the contract was given to Grubb-Parsons, but the actual construction was by Hilger of London.



## 7. D.D.O. - The Administration Building

### Choosing an Architect

The main administration building of the Observatory was a very important matter and little progress could be made on it until we had chosen an architect.

On September 17 I discussed with Mrs. Dunlap whom we should choose. She preferred not to name any one. Her son Moffat was present and suggested Paisley, who was architect for St. Andrew's College when it was moved to its site north of Aurora. Moffat attended this school and his father was a generous contributor to its needs.

I discussed the matter with Mr. Holden, who also did not wish to name any person. I also talked the matter over with several interested people. Finally, on December 4 I wrote to Dr. Cody, Chairman of the Board of Governors, as follows:-

December 4, 1931

Rev. H.J. Cody, D.D.,  
Chairman, Board of Governors,  
University of Toronto.

Dear Dr. Cody,

Mrs. Dunlap and her legal adviser Mr. Holden have informed me that they are prepared to proceed with the erection of the main observatory building; also that they would be quite satisfied to have Mathers and Haldenby act as architects.

As the University is to own and operate the observatory when it is completed, and as Mrs. Dunlap intends to ask the Superintendent to advise on the plans and supervise the construction, she and Mr. Holden wish me to find out if the above choice of architects would be satisfactory to the Board of Governors.

I shall be glad if you will present this matter to the Board and let me know if they approve the proposal.

Very sincerely yours  
C.A. Chant

The reply to this letter, signed by the Secretary of the Board of Governors, was as follows:-



11 December, 1931

Professor C.A. Chant,  
Department of Astronomy,  
University of Toronto.

Dear Professor Chant:-

At the meeting of the Board of Governors held yesterday the chairman presented your letter to him of the 4th instant with regard to the selection of Architects for the erection of the Dunlap Observatory; and I am directed to inform you that in view of the fact that the choice of the donor is Messrs. Mathers and Haldenby, as intimated in your letter, the Board approve of the selection of that firm as the Architects of the building.

Yours truly,  
F.A. Moure

Under date December 12, 1931, I communicated the substance of this letter to Mr. Holden, and on December 16 I had a conference with him.

Next day when I was in the office of Superintendent Le Pan he telephoned to Mathers and Haldenby, requesting one of them to come to his office. Mr. Haldenby came at once and I was pleased to inform him that his firm had been chosen architects for the David Dunlap Observatory.

In my campaign for an observatory during the previous twenty years Messrs. Sproatt and Rolph had given me great assistance, all freely rendered, and naturally I was disposed to favour that firm, which was famous around the University for its production of Hart House and other noted buildings. I felt I should make some sort of apology for someone else being selected to design the main building of the Dunlap Observatory. So I went to see Mr. Sproatt, to inform him that Mathers and Haldenby had been chosen and to "make my peace" with him. I attempted to utter some apology to Mr. Sproatt but he would not listen to it. He was most generous in offering congratulations and best wishes for our success. Circumstances had changed and he was happy to have helped us.



Sites for the Buildings; additional Land

In the spring of 1932 it was necessary to determine precisely where the Great Dome and the Administration Building would be located.

The north boundary of the 123-acre lot which we possessed passed almost exactly through the summit of the hill which is so conspicuous from Yonge Street, and it had always been Mrs. Dunlap's intention to secure the northerly half of the hill. An offer to purchase some eleven acres from the owner was not accepted. He was unwilling to cut out a small portion from the middle of his land. The entire area contained 55 acres and it adjoined our 123-acre lot from the railway to the Second Concession of Markham Township. It was the northerly part of Lot 43 while our 123 acres were that portion of Lot 42 east of the railway and running to the Second Concession. The price asked was \$250 per acre, making a total of \$13,750. The land was purchased. This gave a compact plot of land about three-eighths of a mile wide by three-quarters of a mile long. Along the north boundary runs Hunt Lane with about a dozen cottages on its north side.

At this time it was felt that although we had a perpetual right-of-way over the land west from our property to Yonge St., and it would likely become a Township road, it was desirable for the Observatory to possess an approach over a road of its own. The best location for this road, it was agreed, was directly south from the Great Dome in the precise north-south direction over Lot 41 to Sideroad 40. A visitor from Toronto would turn right at Stop 23 on to the sideroad, travel half a mile east and turn left and go half a mile north. In this case the railway would be crossed on the public highway, not on a private way. This proposal was approved by everyone, and a friend offered to supply the right-of-



way. However the price demanded was excessive and the project was held in abeyance. In 1948 negotiations were started again and were completed in 1950. The area secured is in the shape of an elongated parallelogram stretching across Lot 41. The short north and south sides are 6 chains (396 ft.) long and the other long sides are 1393 ft. 9 in. Lot 41 here is not exactly  $\frac{1}{4}$  mile, or 1320 feet, or 20 chains wide. It is 1334.3 feet, and the area of the parallelogram is 12.129 acres. If the width had been exactly 1320 feet, the area would have been exactly 12 acres. The Observatory land thus comprises  $123 + 55 + 12$  acres.

#### Designing the Administration Building

Dr. Young and I at once carefully considered what accommodation would be required in the building. On the ground floor would be various administrative offices, a lecture room, the library, as well as the central entrance. On the first story, more offices, measuring room, computing room, photographic and dark room, apparatus room, store room. In the basement, machine shop, carpenter shop, mirror-grinding room, clock room, heating plant and so on. The list was put in Mr. Mathers' hands and he planned how to include them all. Then the outer appearance of the building was considered. In the end we obtained a building which has been acclaimed by everyone as beautiful, appropriate and effective. It is 91 feet long and 49 feet wide, with semi-octagonal projections at each end. It is constructed of Credit Valley limestone with trimmings of Queenston stone.

The contract for the Administration Building was awarded to Sullivan and Fried of Toronto about July 20, 1932. The price was \$98,160, which, with architects' fees of \$6200; hardware, \$1800; clerk of the works, \$1000; and contingencies, \$2000; made a total of \$109,160.



The Laying of the Corner-Stone

The corner-stone of the Administration Building was laid on the afternoon of September 10. It was a beautiful day, cloudless and pleasantly warm. A rough platform had been put together beside the wall from contractor's planks, and upon it were Mrs. Dunlap, President Cody of the University of Toronto, who had recently succeeded Sir Robert Falconer, retiring after twenty-five years of service, and a few others; while a large number of persons, some from a distance, others from the neighbourhood about, were gathered on the surrounding ground.

President Cody in an introductory address referred to David Alexander Dunlap as a man highly respected by all who knew him, sympathetic to all educational and charitable causes, generously spending his income while he lived and at his death leaving noble legacies behind him. Also, he was a keen amateur astronomer, and it was very fitting that his widow, who shared his tastes, should erect to his memory a great observatory. The University had received a number of fine benefactions, and this observatory, in the midst of 178 acres of farmland, to be made into a park, was one of the most notable of those gifts.

At this stage in the proceedings Mrs. Dunlap presented to Dr. D. Bruce Macdonald, chairman of the Board of Governors of the University, a document conveying the property to the University.

Then the President asked me to give some account of the observatory project and I summarized the events of the previous ten years and the work to be undertaken when the observatory was complete.

Then the Stone was lowered to its place in the wall, and with a silver trowel presented by Mr. Eric Haldenby, one of the architects



of the building, Mr. David Moffat Dunlap, son of the donor of the Observatory, assisted the stone to its final position, and declared it to be laid.

TO THE GLORY OF GOD AND THE MEMORY OF MY FATHER.

Following this, President Cody offered a dedicatory prayer. Then brief addresses were made by Sir William Mulock, Chancellor of the University and Chief Justice of Ontario; Hon. G.S. Henry, B.A., L.L.D., Minister of Education and Premier of the Province; and Hon. G. Howard Ferguson, B.A., L.L.D., former Premier of Ontario and at this time High Commissioner for Canada in London, Eng. All referred to the magnificent gift by Mrs. Dunlap, not just to the University but to the whole of Canada.

President Cody remarked that he had in his possession a photograph of the Executive Committee for 1888-1889 of the Literary and Scientific Society of University College, and three of that group were on the platform on this occasion. They were H.J. Cody, 1st vice-president of the Society; George Howard Ferguson, Secretary of Committees; and C.A. Chant, 3rd year Councillor.

At the close of the meeting those present made their way up to a large tent on the summit of the hill 250 feet away, where refreshments were served through the kindness of Mrs. Dunlap.

The Administration Building was completed in a year. It was my practice to go up each week to the site of the observatory and take a roll or two of photographs. Thus I had a continuous knowledge of what was being done and a pleasing record of the growth of the building.

For raising materials to the second story and the roof, the contractor had an elevator at the middle of the back of the building. The last burdens which it carried to the roof were the parts



of Dr. Young's 19-inch telescope, which was to be erected in the south dome on the building. It was then dismantled.



8. D.D.O. - Production of the 74-inch MirrorThe 74-inch Mirror

The contract for the great telescope, which was let in May 1930, included the production of the disc of glass for the 74-inch mirror. I believe Sir Charles Parsons viewed this undertaking with some pleasure. Since he had become proprietor of the Derby Glass Works he had had some noted successes in producing discs of glass. In 1845 his father had made a metal mirror six feet in diameter; here was a mirror to be produced with a diameter two inches greater, the making of which would even eclipse his father's greatest effort.

In a report from the Glass Works dated February 11, 1931, was an account of the production of several smaller discs required in carrying out the contract, and also of some experiments bearing on the great disc. One week later, on February 18, 1931, Parsons died at Kingston, Jamaica, on board the ship Duchess of Richmond, on which he and his wife were taking a trip to the West Indies. He was born on July 13, 1854, and hence was in his 77th year.

If Parsons had lived I believe his ingenuity and ambition and persistence would have led to success in producing the big disc of glass, but without his skilful direction the experiments, which were continued for three years, were not very promising and were very expensive. I understand a big commercial firm offered to supply a disc made from crown glass, but this, though much cheaper, was not considered quite satisfactory for a great telescope.

A letter from Lady Parsons, dated April 2, 1931, will be found interesting in connection with this matter:

Ray Demesne,  
Kirkwhelpington,  
Northumberland.

Dear Mr. Chant

I received your letter of March 16th. and thank you for your kind sympathy with me in my sorrow.



My husband's passing has been a great shock to me; he was only ill a few days and I confidently expected him to be well within a week. His passing was quite peaceful and painless.

He was immensely interested in the Toronto telescope. That work was new to him and consequently he went at it with enthusiasm and was ready to make any experiments to produce a perfect instrument.

It is a little comfort to me that so many people loved him for his personality as well as they admired his genius and attainments.

Thanking you and Mrs. Chant once more,

Sincerely yours

Katharine Parsons

### Fused Quartz and Pyrex Glass

However, in 1932 help came from an unexpected quarter. The great project of building a 200-inch telescope was authorised in 1928, the probable cost to be \$6,000,000. It was essential that the mirror should be made of a substance with a very small coefficient of expansion with heat. Quartz is well known to possess that quality, and it was proposed to use quartz sand, or break up quartz into small pieces and fuse it into a single solid disc. Much time and money were spent in experiments to produce such discs, but the Committee in charge of this project at last decided there was little chance of success in this way. So in 1931 the Corning Glass Works at Corning, N.Y., was asked to produce the enormous disc from Pyrex glass. The Company investigated the best way to perform this mighty undertaking. They built new furnaces to melt the great quantity of material required and devised new methods of handling it and of annealing the discs after they had been poured. In 1932 they were almost ready to produce the immense 20-ton disc.

### Eclipse of the Sun, I.A.U., Corning Glass Works

The fourth general meeting of the International Astronomical Union was held at Cambridge, Mass., on Sept. 2 - 9.

The University of Toronto had made extensive preparations to



observe the total eclipse of August 31 at St. Alexis des Monts in the Province of Quebec. The sky was cloudy and we secured no observation of any value; but we had done our duty by setting up our camp in our own country.

After the eclipse I went, with my wife, to Cambridge to attend the I.A.U. At the meeting I let it be known that we were disappointed in our hopes to secure the disc for our 74-inch mirror; and I was told of the preparations of the Corning Glass Co. to make the 200-inch disc. At the banquet on September 8 (Thursday) I found myself sitting alongside Walter S. Adams, Director of the Mount Wilson Observatory and a member of the Committee on the production of the 200-inch telescope. He told me that the report was correct that the Corning Glass Co. expected soon to cast the great disc.

I asked him if his Committee would object to my inquiring if the Company would undertake to produce the 74-inch disc. He assured me that no objection would be raised, and he said he intended to go to Corning in a few days and would urge the Company to give us all possible assistance.

We returned to Toronto on Friday, Sept. 9, and next day at 3 p.m. was the ceremony of laying the corner stone of the Administration Building of our Observatory.

#### The Pyrex Disc

When I reported to Dr. Young, my colleague, and to Mr. Bell, the agent for the Parsons company, what I had learned about the Pyrex disc for the 200-inch mirror, they were mightily interested; and of course they approved my proposal to ask the Corning Glass Works if they would undertake to make a disc for the 74-inch mirror.

The reply of the latter to my inquiry was prompt. They were



willing to supply the disc, the work on it to begin within six months. The price would be: for a plain disc, \$11,000; for one with open spaces in the back, as proposed for the 200-inch disc, \$12,000.

We were pleased with the offer, as also was the Grubb-Parsons firm when it was communicated to them.

Six months later we were invited to Corning to discuss the production of the disc. On March 16, 1933, Dr. Young and Mr. Bell and I, in Mr. Bell's car, drove to Corning, about 240 miles from Toronto; and next morning we had a conference with officers of the Corning Glass company.

It was agreed that the Company would supply a plain disc large enough to make a mirror of diameter 74 inches of clear reflecting surface. The thickness of the finished mirror should be 12 inches at the edge and 11 inches at the centre. A hole about 7 inches in diameter was to be cast through the centre of the disc. In order to save the grinding away of material, the lower surface of the disc would be cast concave with a radius of about 685 inches - a "dip" of one inch in the surface.

Mr. Bell had been authorized by his Company, if the conditions proposed were satisfactory, to give an order for the work to proceed at once, while a contract should be drawn up and sent to England for the firm's signature.

There was a discussion as to what guarantees the Glass company should give. There were many uncertain factors and it was difficult to specify just what could be guaranteed. In the end, I believe it was left almost a "gentleman's agreement", the Company undertaking that the disc should be "satisfactory". It was a pleasure to deal with such a company.



At the end of the conference we were informed that the pouring of the disc would take place in six weeks, and we were invited to come down to see the operation.

### Pouring of the Pyrex Disc

The preparations for the pouring of the disc for the 74-inch mirror required more than six weeks, but about the middle of June a telephone message from Corning stated that they expected to do the pouring on the morning of the 21st - the summer solstice.

On the day before that date my wife and I in Mrs. Dunlap's car; and Dr. Young and P.H. Mitchell in Mr. Bell's car, motored to Corning. Mr. Mitchell was a consulting engineer (brother of Gen. C.H. Mitchell) who was interested in the problem of utilizing glass in the making of artificial teeth. (P.H.M. died July 27, 1953, age 70). We put up at the <sup>Baron</sup> Steuben Hotel - guests of Corning Glass Works.

Early in the morning we went to the near-by Works, where the pouring was scheduled to begin at 5.30 a.m. on account of the very hot weather then prevailing.

I may say that ordinary Pyrex glass has a much smaller coefficient of expansion with heat than that of crown glass, the ratio being about 32 to 92 and hence it is much more desirable for a telescope mirror. But the particular type of Pyrex developed specially for these big discs has a coefficient of expansion one-fourth less than that of ordinary Pyrex.

### The Corning Method

I believe that usually in casting a large disc the sand and other ingredients are melted together in a furnace which is then tapped, and the liquid glass flows out into the mould. This method was not followed at the Corning Glass Works.



The melting furnace contained about 75 tons of glass, and it had taken five weeks to insure that it was of the proper consistency. The furnace was heated by gas and the maximum temperature attained was about 1600 deg. C. = 2912 deg. F. The mould, which was constructed from refractory bricks was about 25 feet away from the furnace. First, the scum was drawn from the surface of the glass in the furnace, then a large iron ladle capable of holding about 800 pounds was thrust through the furnace door, filled with glass and then carried by means of an overhead trolley to the mould. Over the mould was a domed covering shaped like an old-style beehive. The door of the latter was pulled aside, the ladle was pushed within and inverted. The viscous glass flowed from it and slowly flattened out in the mould, which was being maintained at a temperature of about 800 deg. C. When about half of the contents had run out of the ladle it was withdrawn and the balance of the glass in it was dumped on an iron plate from which it was drawn into a tub of water. This process was continued until the mould was filled, thirteen ladle-fuls, or nearly two and a half tons in all, being required. The operation lasted two hours.

Each ladle of glass as it was poured into the mould could be seen spreading out over the previous ones. When the mould was full the temperature was raised to 1250 deg. C. and held there for about  $4\frac{1}{2}$  hours. This was done to bring the glass to a homogeneous consistency and also to cause any bubbles in it to rise to the top. Then the upper bee-hive covering was raised and the mould pushed aside into the open, revealing the tawny-red disc of glass. I got a photograph of it.

After allowing it to cool for four or five hours, until a temperature of 600 deg. C. was reached, it was moved under the



annealing oven into which it was raised. The temperature was set at 475 deg. and the disc fell to this. Next it was brought up to 530 deg. and held there for nine days. This was the "soaking" process. After this the cooling began, first at the rate of 2 2/3 deg. a day until 380 deg. was reached, and then the rate was increased to 18 deg. a day. Quite a process, but the result was satisfactory.

#### The Pouring Operation and after

Of course the pouring of the disc was intensely interesting to us from Toronto. When it was finished we were offered a light breakfast in the Works, and then we relaxed a while. After this we were shown over the works. Among other things, we saw thermometer tubing being manufactured. About noon we went to the spacious show-rooms, where a beautiful lunch had been spread for us. Mrs. Dunlap sat at one end of the table and I at the other. Present were the President of the company and some of his experts, - I believe Dr. J.C. Hostetter and Dr. E.C. Sullivan. The latter was a graduate student at Leipzig in 1898 when I was there. It was a very pleasant occasion.

This was the largest disc, up to this date, made by the Corning Glass Works. They had made a 30-inch and a 60-inch disc; and a few days after ours, poured one 120 inches in diameter. The first pouring of the disc for the 200-inch mirror was on March 25, 1934, and as it was not entirely perfect a second one was poured on December 2 of that year.

We started for home about 2 p.m. Before we left, the Company presented to Mrs. Dunlap and my wife, each a beautiful, artistically-wrought Pyrex teapot as a souvenir of the occasion. Mrs. Dunlap's party stopped over-night at St. Catharines, and made Toronto comfortably next morning.



The Disc annealed; ready for Inspection

Late in September we were informed by telephone that the disc had been removed from its mould, or the reverse, that the mould had been taken away from the disc, and we were asked to go down to inspect it. On September 28 Dr. Young and I drove to Corning and next morning we went to the Glass Works. The great disc had been turned up on its edge and was certainly an imposing object. The lower (concave) surface and the edge were comparatively smooth, but the upper surface was rough and uneven. The irregularity of the upper surface is due to the very high temperature required to melt the ingredients of Pyrex and to the high viscosity of the molten substance.

By careful annealing one endeavours to remove internal strains and thus produce a perfectly uniform mass. To test for this, polarized light is used. I shall not try to explain the process, it is rather technical, but we applied it to various parts of the disc and we found it exceptionally free from strain. We believed that from it could be fashioned the great 74-inch mirror!

It had been requested that if we found the disc "satisfactory" we should ask the Corning Glass Works to ship it as soon as possible to Montreal to be put aboard the very ship which had brought over the mounting of the telescope. It left Corning on Oct. 5 and Montreal on the 15th and probably reached Newcastle early in November, 1933.

Mr. Cyril Young estimated that it would require 18 months to grind and figure and polish the great mirror. On arrival at the Optical Shop the disc was 76 $\frac{1}{2}$  inches in diameter and almost 14 inches thick. We received photographs taken at Newcastle in December 1933 showing (1) the grinding tool on the concave surface



and (2) when lifted above it after the rough-grinding had been completed.

Did not retain its Shape

As the work on the mirror proceeded we continually received reports of progress, - and then we were somewhat disturbed. When the surface had been polished sufficiently for optical tests to be applied to it word came to us that it seemed not to retain perfectly its shape, that it seemed unstable! What should be done about it? The head optician at Newcastle, Armstrong by name, boldly rough-ground away half-an-inch of the surface, taking a month to do so, and then started to fine-grind and polish again. This expedient was successful; the new surface kept its shape. In consequence of the extra expense by the firm, Mrs. Dunlap added an extra £100 to the price.

The Mirror complete; Dr. Young tests it.

In March 1935 tests showed that the surface of the mirror was approaching its final shape, and at last we were informed that the optical workers on it believed they could not further improve it. We were asked to have some one, on our behalf, make actual measurements on its surface.

Now this was a very technical job, but one that Dr. Young was specially qualified to undertake. With the assistance of Mr. Bell a passage was secured for him on a ship about to sail for England. There was not time to secure the usual consular certificate, but Dr. Young hastened directly to New York and was allowed to go on board the ship. On reaching England he went at once to Newcastle, where every facility was given to him to make tests on the mirror. His measurements verified those made by the shop-workers on the project. These tests allowed one to place the mirror in the high-



est class. Dr. Young stated that the surface of the mirror was at no place at fault, i.e., <sup>it</sup> <sup>at no place</sup> differed from the theoretical value, more than two millionths of an inch.

The precious mirror was then carefully packed in its strong case which, with its contents, weighed five tons. On May 2, 1935, it arrived at the Observatory and was unloaded into the Great Dome through an opening made in the wall. On May 7, the day after King George V's Jubilee Celebration, it was placed in its steel cell, which next day was attached to the lower end of the tube of the telescope, thus completing that noble instrument.



9. Water Supply: Observatory HouseWater Supply for the Observatory

At the time the farm property was purchased there were about half-a-dozen wells on it. The best one of all was at the stable, to serve the animals and to keep the milk cool. This one the contractor began to use for mixing cement but it soon became dry and he had to bring in water from Richmond Hill. A stone-boat bearing cans of water was drawn by a tractor up our long and muddy lane. These wells were shallow, perhaps 20 feet deep, and not able to supply the quantity of water needed by the Observatory.

So the Jordan-Roberts Co. of Brantford was employed to secure a satisfactory water supply. This company undertook, (1) to locate an unfailing source of water capable of providing 50 gallons a minute, and (2) to install an automatic pumping system able to force it to any part of the property.

In searching for water the well-driller was to receive \$1.00 for each foot the drill went below the surface of the earth. I had noted that at the Ontario Hospital (then known as the Jail Farm), one mile south of the Observatory property, the water supply seemed to be located on a hill and not far from the buildings. So I suggested the well-driller sink his first hole about 100 feet east of the Administration Building. He did so, but after drilling 350 feet declared the experiment a failure. He obtained some water when the drill was passing through beds of shale but it was not usable for domestic purposes.

Next we tried in the south-west corner of our property. This was about 50 feet lower than the Administration Building, on flat land and about 100 yards from a small ever-flowing stream. Here, I believe, the driller intended to go down 200 feet; but when he



had reached 160 feet he attempted to draw out his drill to examine it, but it came loose and he could not recover it. He thought it best to try another place.

Dr. A.P. Coleman, professor of geology, Superintendent A.D. Le Pan and I then had a conference. We went <sup>down</sup> to examine the low-lying portion of the property as it borders on the "Second of Markham". This was half a mile east from the Administration Building and about 60 feet below it in level. Also it was in a definite valley. Further, in the village of Richmond Hill they had located an excellent well about a mile east from Yonge St. and almost north of this place we were examining. I wondered if the same water-bearing stratum was below us. At any rate we thought this spot seemed the "logical" place to try next.

So the driller moved his gear to this place. At 90 feet he strongly suspected he was near a good supply of water, and in less than five feet more he was perfectly certain he had found an excellent well. He tested the flow and found it could yield 135 gallons a minute. That was nearly three times the amount we wished to have guaranteed.

Having found an abundant source of water the well was sunk and its 12-inch casing was put in. Usually the water rises in this well to the surface of the earth. The pump within its 4-inch pipe extends down some 70 feet, with the "impeller" at the lower end. It is caused to rotate by an electric motor supported on the top of the casing. The water is forced into a cast-iron pipe laid five feet below the surface of the earth and running half-a-mile up the hill to the Administration Building, in the basement of which is a large pressure tank. When the pressure reaches 50 pounds per square inch the power is turned off automatically.



The water is very "hard" and in the basement of the Administration Building it goes through a softening process.

The preliminary drilling for water cost some \$700; the total cost was about \$15,000.

#### House for the Director and for the Caretaker

On the area of land purchased first was a number of buildings, the chief one being the dwelling-house. It was about one-quarter of a mile south from the summit and was protected from the west winds by a cluster of Norway Spruce and Sugar Maple trees, prominently seen from Yonge Street, which was half-a-mile away. It faced west and had a commanding outlook. A series of rather imposing houses had been built, about a mile apart, along the east side of Yonge Street and some distance back from it. This one, I was informed by Mr. George Padget, many years Reeve of Markham Township, was erected about 1865. It was planned on commodious lines, with many bed-rooms, a big living-room and a central sewing-room upstairs. On the north and south ends and on the west front was a verandah.

Attached to it at the rear was a smaller house where was the dining-room for the family, including the hired men who slept in its upper story. This smaller house had been built and occupied before the main house in front was added. Adjoining the smaller house was the kitchen and behind it was the woodshed and into the wall between them a brick oven was built. Firewood would be fed into this oven from the woodshed and when its temperature had risen sufficiently high, the hot coals would be drawn out and the loaves of bread in their pans would be pushed in from the kitchen and left there to bake. There were many brick ovens in Ontario when I was a boy.



Next to the woodshed was the driving-shed in which the buggy or light wagon was kept. Mounted on the roof of this was the farm bell.

In addition there were barn and stables, mile-house, an extensive hen-house and other structures. But conditions were rapidly changing and the property needed many repairs.

### Remodelling the House

The remodelling of the house was put in the hands of L.A. Beatty, one of Toronto's building contractors. He was in the habit of consulting Mr. Holden's law firm when he wished to obtain a loan in connection with his building operations or when he needed legal assistance in his business. He was willing to undertake the work on the old dwelling.

Mr. Beatty was expert in planning and was full of expedients in making the best use of the space at his disposal. He put in hot-water heating. He removed the old verandah but retained a portico over the front door and a porch over the north door utilizing original pillars and pilasters. He added a pleasing sun-room on the south side. Out of two adjoining bed-rooms on the ground floor he made a dining room and a modern kitchen, and upstairs he found room for two good bath-rooms. Also, hardwood floors were laid throughout. In addition, the smaller house, attached to the larger one at the rear and used at one time as the family dining-room, was made over into separate comfortable quarters for the observatory caretaker. The total cost was approximately \$10,000. Besides this an excellent brick garage was built at a cost of \$1200.

### Official Opening of the Observatory

About April 1, 1935, I discussed with President Cody the date of the official opening of the Observatory. The big mirror had not



yet come but we were confident it would arrive in time.

The usual time for the Commencement proceedings, i.e., the conferring of degrees and the holding of various celebrations, has long been the first week in June. Now in connection with our Opening we intended to have a Special Convocation for the conferring of honorary degrees, and the most suitable arrangement seemed to be to have the Formal Opening on the Friday afternoon and the Special Convocation on the Friday evening of the last week in May. Looking at the calendar, we saw that this Friday would be May 31. Said I, "That will be my 70th birthday."

Thus the very day when I should achieve the dream of my life would be the date of my formal retirement from the University!

At the Special Convocation on May 31, 1935, the Honorary Degree of L.L.D. was conferred upon Sir Frank Dyson, Mrs. Dunlap and me; that of D.Sc., on Harlow Shapley, V.M. Sliphe<sup>n</sup> and W.E. Harper.

A full account of the proceedings on that notable day of my life is printed in the Journal of the Royal Astronomical Society of Canada for September 1935.

#### We Move up to the Observatory

On Wednesday, May 16, 1934, Jean and I moved up to Observatory House. Our furniture had been taken there some weeks before and it did not take long to get settled. Mrs. Dunlap came up to see us in the afternoon. She had just arrived home from abroad and she reported that she was on the "Olympic" when it ran over the light-ship "Nantucket" the day before, May 15.

On May 29 Mrs. Dunlap and Dr. Jenkins (manager of her farm) called to discuss furnishings, especially for the Donor's Room in the Administration Building.

On June 9 (Sat.) Mrs. Dunlap and Premier W.L.M. King came up



to see the Observatory and called at the house. I knew him as a student, and also his father who was a member of the University Senate. I remember that the Premier asked for a drink of water. I gave him a glass directly from the 'cold'tap and he praised our water supply highly. Then we went up to the Administration Building and the Great Dome. The telescope (except the mirror) was in place but the cement floors had not been completed. He was greatly impressed with it all. When they left he went to Sir William Mulock's house on Jarvis St.

When the Observatory was officially opened, a year later, Mr. King came up from Ottawa, without informing us that he would be present. He also occupied a modest seat at the Special Convocation in the evening and at the request of Dr. Cody, the chairman, he made an appreciative address. I hope I shall be pardoned if I quote the printed report of his closing sentences:

He most warmly thanked Mrs. Dunlap and praised her selection of such a memorial to her husband. The David Dunlap Observatory was a combined monument - resembling a double star of which the components are so close as to be seen as one - to the generosity of the donor, and to the memory of her husband. He spoke kindly of the long-enduring and unflagging enthusiasm and determination of Dr. Chant, and rejoiced in the happy culmination of his plans.

From his own personal point of view, he spoke of his happiness at being able frequently to return to his Alma Mater. He did not come for relaxation, nor recreation, but because, in the University he found real inspiration for his own life. And in the realization of such a magnificent, unselfish, and noble project he found an especial inspiration.

### A Christmas Parcel

One evening shortly before Christmas 1934, when the snow was abundant in the Observatory Lane and around the observatory buildings, there was a knock at the door, and a flat parcel was handed to me. I did not examine it carefully as I supposed it was something for the Observatory, perhaps a picture for the Donor's Room, sent up from the city. A couple days later I received a telephone



message from Mrs. Dunlap asking if I had received a parcel the other evening and if I liked it. I said I had not opened it as I supposed it was for the Administration Building. She said it was for me.

When I opened the parcel I found in it a sterling silver tray 27 inches long and 17 inches wide, and on it was engraved:

To

Doctor C.A. Chant

a souvenir of our several years of co-operation

in the erection and completion of

1926            The David Dunlap Observatory            1934

from

Jessie D. Dunlap

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#### Living Retired - My Wife and I

We found Observatory House a very comfortable and pleasant place to live, and when I was told that I should occupy my office in the Administration Building as long as I wished, my happiness was complete. Everything that I desired had come my way!

We attended the International Astronomical Union in Paris in July 1935. We saw the people dancing on the streets on Bastille Day (July 14), and on the evening of that day we were at a banquet offered by the Astronomical Society of France at the first stage of the Eiffel Tower. In 1938 the I.A.U. met in Stockholm and we were present. Practically all the astronomers of the world attended these meetings and I had the wonderful feeling that they were all my friends! When not abroad we spent the summer at Go Home Bay.

In the winter of 1935-6 we drove to Florida. This was our



first visit and we repeated it in the four following years, by which time the Second War was on us and we then stayed at home.

On October 6, 1943, my wife passed away. Just a month earlier she had turned 74 and we had been married six months short of 50 years.

Mrs. Dunlap died on July 31, 1946. She was 79. It was almost 22 years since her husband had died and during that time she lived a strenuous, useful and good life.



